

Supplementary Table 1.

Phytochrome Protein Sequence	Species	Accession Number
acvphy1 (1117 aa)	Adiantum capillus-veneris; fern	gil6226671 spl P42496 PHY_ADICA
acvphy2 (1140 aa)	Adiantum capillus-veneris; fern	gil3724346 dbj BAA33775.1
apphy1 (1129 aa)	Anthoceros punctatus	
arphyA (1122 aa)	Armoracia rusticana	gil9049368 dbj BAA99410.1 gil9049366 dbj BAA99409.1 gil9049364 dbj BAA99408.1
asphya3 (1129 aa)	Avena sativa L.; oat	gil16111 lemb CAA26999.1 gil130181 spl P06593 PHY3_AVESA gil166563 gbl AAA76820.1 gil82338 pir A29631
asphya4 (1129 aa)	Avena sativa L.; oat	gil16113 lemb CAA27000.1 gil130182 spl P06594 PHY4_AVESA gil82336 pir S00097
atphya (1122 aa)	Arabidopsis thaliana L. (mouse-ear cress) Columbia 3702	gil16421 lemb CAA35221.1 gil65878 pir FKMUA gil3482934 gbl AAC33219.1 gil14517372 gbl AAK62577.1 gil15217562 ref NP_172428.1 gil6093714 spl P14712 PHYA_ARATH gil25282816 pir D86229 gil404670 gbl AAA21351.1
atphyb (1172 aa)	Arabidopsis thaliana L. (mouse-ear cress) Columbia	gil16423 lemb CAA35222.1
atphyb (1168 aa)	Arabidopsis thaliana L. (mouse-ear cress) ABRC CS3880	gil39939388 gbl AAR32737.1
atphyc (1111 aa)	Arabidopsis thaliana L. (mouse-ear cress) Columbia 3702	gil37623877 gbl AAQ95581.1 gil10176703 dbj BAB09925.1 gil16425 lemb CAA35223.1 gil65880 pir FKMUC gil15239211 ref NP_198433.1 gil130192 spl P14714 PHYC_ARATH gil576939 lemb CAA83549.1
atphyd (1164 aa)	Arabidopsis thaliana L. (mouse-ear cress) Landsberg erecta	gil452814 lemb CAA54072.1
atphyd (1164 aa)	Arabidopsis thaliana L. (mouse-ear cress) Columbia 3702	gil452814 lemb CAA54072.1 gil7268374 lemb CAB78667.1 gil2244983 lemb CAB10404.1 gil12644264 spl P42497 PHYD_ARATH gil15234859 ref NP_193360.1 gil7430891 pir B71429
atphye (1112 aa)	Arabidopsis thaliana L. (mouse-ear cress) Columbia 3702	gil7268606 lemb CAB78815.1 gil452817 lemb CAA54075.1 gil5816999 lemb CAB53654.1 gil1172498 spl P42498 PHYE_ARATH gil15236763 ref NP_193547.1 gil1076376 pir S46313
cphy2 (1121 aa)	Ceratodon purpureus; moss	gil1674478 gbl AAB19058.1 gil1314837 gbl AAB67863.1
cphy3 (1126 aa)*	Ceratodon purpureus; moss	gil25986851 gbl AAM94956.1
cphyA (1124 aa)	Cucurbita pepo (zucchini) (vegetable marrow) (summer squash)	gil130185 spl P06592 PHYA_CUCPE gil65877 pir FKPUZ gil167501 gbl AAA33115.1 gil225435 prf 1303260A
cphyA (1112 aa)*	Cyrtosia septentrionalis	gil37723871 gbl AAR0219.1
cuphya (1119 aa)	Cuscuta pentagona	gil38037178 gbl AAR08425.1
gmphyA (1131 aa)	Glycine max soybean	gil1172495 spl P42500 PHYA_SOYBN gil7430893 pir T07137 gil515751 gbl AAA33999.1

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		gil515749lgb AAA33957.1I
gmphyb (1156 aa)	Glycine max soybean	gil1172496lsp P42499 PHYB_SOYBN gil7430894lpir T07756 gil516103lgb AAA34000.1I
inphye (1115 aa)	Ipomoea nil cv violet aka Pharbitis nil morning glory	gil1145714lgb AAA84970.1I gil1730566lsp P55004 PHYE_IPONI
lephya (1123 aa)	Lycopersicum esculentum; aka tomato	gil3492801lemb CAA05089.1I gil3492799lemb CAA05088.1I gil3492797lemb CAA05087.1I gil3492795lemb CAA05086.1I
lephyb1 (lephb1, 1131 aa)	Lycopersicum esculentum; aka tomato	gil4038600lemb CAA05293.1I
lephyb2 (lephb2, 1121 aa)	Lycopersicum esculentum; aka tomato	gil5757903lgb AAD50631.1I AF122901_1
lephye (1137 aa)	Lycopersicum esculentum; aka tomato	gil6708129lgb AAF25812.1I
lephyf (1118 aa)	Lycopersicum esculentum; aka tomato	gil6671484lgb AAC49301.2I
lsphya (1124 aa)	Lathyrus sativus (chickling vetch)	gil2499555lsp P93673 PHYA_LATSA gil1848273lgb AAB47994.1I phy
mcphy1b (mcphy1, 1142 aa)	Mesotaenium caldarium; green algae	gil1125699lgb AAC49128.1I
mgphya (1126 aa)	Monotropastrum globosum	gil38037242lgb AAR08427.1I
mpphy1 (1126 aa)	Marchantia paleacea var. diptera; liverwort	gil13429830ldbj BAB39687.1I
msphy1 (1124 aa)	Mougeotia scalaris (hassel)	gil1419681lemb CAA64796.1I p gil2507185lsp P33529 PHY_MOUSC
npphyb (1135 aa)	Nicotiana plumbaginifolia	gil2370331lemb CAA74992.1I gil7430905lpir T16973
ntphya (1124 aa)	Nicotiana tabacum	gil297478lemb CAA47284.1I ty gil464380lsp P33530 PHY1_TOBAC
ntphyb (1132 aa)	Nicotiana tabacum	gil464387lsp P29130 PHYB_TOBAC gil7430892lpir T03668 gil295346lgb AAA34092.1I
omphya (1123 aa)	Orobanche minor	gil38037208lgb AAR08426.1I
osphya (1228 aa)	Oryza sativa rice indica	gil20288lemb CAA32375.1I gil130187lsp P10931 PHYA_ORYSA gil82499lpir S03728
osphya (1228 aa)	Oryza sativa rice japonica	gil21321786lgb AAM47309.1I gil50540697lgb AAT77854.1I gil30578176ldbj BAC76431.1I
osphyb (1171 aa)	Oryza sativa rice indica	gil646949lemb CAA40795.2I gil130190lsp P25764 PHYB_ORYSA gil100695lpir S14065
osphyb (1171 aa)	Oryza sativa rice japonica	gil57506674ldbj BAD86669.1I gil30578178ldbj BAC76432.1I
osphyc (1137 aa)	Oryza sativa rice indica	gil7672696lgb AAF66603.1I
osphyc (1137 aa)	Oryza sativa rice japonica	gil50918769ref XP_469781.1I gil31712054lgb AAP68360.1I gil21070927lgb AAM34402.1I gil40538982lgb AAR87239.1I gil18206263lsp Q9ZWI9 PHYC_ORYSA gil4190974ldbj BAA74448.1I
paphy1 (1136 aa)	Picea abies (norway spruce)	gil2499556lsp Q40762 PHY_PICAB
pbphyb1 (1151 aa)	Populus balsalmifera subsp. trichocarpa	gil10954091lgb AAG25725.1I AF309806_1
pbphyb2 (1146 aa)	Populus balsalmifera subsp. trichocarpa	gil10954093lgb AAG25726.1I
pcphya (1129 aa)	Petroselinum crispum (parsley)	gil556667lemb CAA53165.1I gil1730565lsp P55141 PHYA_PETCR gil1076573lpir S52631
ppphy0 (1132 aa)	Physcomitrella patens; moss	gil402606lemb CAA52933.1I; gil480719lpir S37206SW:P36505
ppphy1 (1123 aa)	Physcomitrella patens; moss	gil25986845lgb AAM94953.1I
ppphy2 (1130 aa)	Physcomitrella patens; moss	gil25986847lgb AAM94954.1I
ppphy3 (1122 aa)	Physcomitrella patens; moss	gil25986849lgb AAM94955.1I

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ppphy4 (1126 aa)	Physcomitrella patens; moss	gil25986843 gbl AAM94952.1I
psphy1 (1131 aa)	Pinus sylvestris (scots pine)	gil2499557 spl Q41046 PHY_PINSY
psphya (1124 aa)	Pisum sativum (garden pea)	gil169132 gbl AAA33682.1I gil51173514 gbl AAT97643.1I gil295830 lemb CAA32242.1I gil130188 spl P15001 PHYA_PEA gil81937 pir S06856 gil226757 prf 1604466A
psphyb (1121 aa)*	Pisum sativum (garden pea)	gil6502525 gbl AAF14344.1I
ptphya (1125 aa)*	Populus tremula X Populus tremuloides	gil2664190 lemb CAA04679.1I gil7430897 pir T09835 gil3914343 spl O49934 PHYA_POPTM
sbphya (1131 aa)	Sorghum bicolor	gil11134026 spl P93526 PHYA_SORBI gil39777227 gbl AAR30883.1I gil1800215 gbl AAB41397.1I gil39777233 gbl AAR30886.1I gil39777231 gbl AAR30885.1I gil39777235 gbl AAR30887.1I
sbphyb (1178 aa)	Sorghum bicolor	gil7110162 gbl AAB41398.2I gil11134029 spl P93527 PHYB_SORBI gil39777267 gbl AAR30903.1I
sbphyc (1135 aa)	Sorghum bicolor Taxon 4558 Sorghum bicolor BTx623 Taxon 4558	gil11134032 spl P93528 PHYC_SORBI gil1800219 gbl AAB41399.1I gil7430906 pir T14803 gil39980604 gbl AAR33022.1I gil39980602 gbl AAR33021.1
slphya1 (1122 aa)	Stellaria longipes	gil33333476 gbl AAQ11871.1I
slphya3 (1123 aa)	Stellaria longipes	gil37779204 gbl AAO86644.1I
slphya4 (1122 aa)	Stellaria longipes	gil37779206 gbl AAO86645.1I
slphyb (1128 aa)	Stellaria longipes	gil33333478 gbl AAQ11872.1I
slphyc (1114 aa)	Stellaria longipes	gil33333480 gbl AAQ11873.1I
smphy1 (1134 aa)	Selaginella martensii (martens's spike moss)	gil400792 spl Q01549 PHY1_SELMA
stphya (1123 aa)	Solanum tuberosum	gil7550158 gbl AAB21533.2I gil464383 spl P30733 PHYA_SOLTU gil100455 pir S20497
stphyb (1130 aa)	Solanum tuberosum	gil2326872 lemb CAA74908.1I gil33302622 spl P34094 PHYB_SOLTU
taphya (1131 aa)	Triticum aestivum wheat	gil57281883 lemb CAC85512.1I
taphyc (1139 aa)	Triticum aestivum wheat	gil18076430 lemb CAC82798.1I
zmphya1 (1131 aa)	Zea mays maize	gil37926849 gbl AAP06787.1I
zmphya2 (1131 aa)*	Zea mays maize	gil130186 spl P19862 PHYA_MAIZE gil29293912 gbl AAO73469.1I gil82715 pir JQ0382
zmphyb1 (1161 aa)	Zea mays maize	gil37926866 gbl AAP06788.1I
zmphyb2 (1166 aa)	Zea mays maize	gil37926881 gbl AAP06789.1I
zmphyc1 (1135 aa)	Zea mays maize	gil37926897 gbl AAP06790.1I
zmphyc2 (1135 aa)	Zea mays maize	gil37926916 gbl AAP06791.1I

Atypical Phytochrome Protein Sequence	Species	Accession Number
acNEO1 acphy3 (1465 aa)	Adiantum capillus-veneris; fern	gil19570333 dbj BAA36192.21 gil7522091 pir T30891
cpphy1 (1307 aa)*	Ceratodon purpureus; moss	gil2851597 spl P25848 PHY1_CERPU gil1839248 lbl AAB47762.11 gil282813 pir S27396
MsNEO1 (1486 aa)*	Mougeotia scalaris; green alga	gil73760080 dbj BAE20158.11
MsNEO2 (1442 aa)*	Mougeotia scalaris; green alga	gil73760092 dbj BAE20164.11

Microbial phytochromes (Cph1/Cph2/BphP/Fph Families)

Cph1s	Species	Accession Number
AphA_all3157_npCph1 (765 aa)	Nostoc sp. PCC 7120 Anabaena variabilis ATCC 29413	gil17230649 ref NP_487197.11 gil17132252 dbj BAB74856.11 gil25282820 pir AF2200 gil12230457 spl Q9LCC2 PHYA_ANASP gil6939712 dbj BAA90662.11 gil53764937 ref ZP_00351563.11
Cph1_slr0473 (748 aa)	Synechocystis sp. PCC 6803	gil16331509 ref NP_442237.11 gil1001165 dbj BAA10307.11 gil7427622 pir S74389 gil2499558 spl Q55168 PHY1_SYNYY3
cwCph1 (760 aa)	Crocospaera watsonii WH 8501 Synechocystis sp. WH 8501	gil46119344 ref ZP_00201497.11 modified annotation by J. Clark Lagarias
cwCph1a (422 aa)	Crocospaera watsonii WH 8501 Synechocystis sp. WH 8501	gil46120294 ref ZP_00179722.21
npCph1 (768 aa)	Nostoc punctiforme PCC 73102	gil53687163 ref ZP_00345175.11
npCph1a (775 aa)	Nostoc punctiforme PCC 73102	gil23127532 ref ZP_00109399.11
Cph2s	Species	Accession Number
AphC_all2699_Cph2b (920 aa)	Nostoc sp. PCC 7120 Anabaena variabilis ATCC 29413	gil17131792 dbj BAB74398.11 gil25531543 pir AD2143 gil17230191 ref NP_486739.11 gil53764825 ref ZP_00160889.21
AphD_all4261_Cph2a (1036 aa)*	Nostoc sp. PCC 7120	gil25533262 pir AF2338
Cph2_sll0821 (1276 aa)	Synechocystis sp. PCC 6803	gil16331738 ref NP_442466.11 gil1673324 dbj BAA10536.11 sll0821 gil12230444 spl Q55434 PHY2_SYNYY3 gil7470803 pir S75801
gvCph2 (566 aa)*	Gloeobacter violaceus PCC 7421	gil37523001 ref NP_926378.11
npCph2a1 (1102 aa)	Nostoc punctiforme PCC 73102	gil23129659 ref ZP_00111485.1
npCph2a2 (1204 aa)	Nostoc punctiforme PCC 73102	gil23129381 ref ZP_00111210.11
npCph2a3 (1042 aa)*	Nostoc punctiforme PCC 73102	gil23130314 ref ZP_00112131.11
npCph2b (910 aa)	Nostoc punctiforme PCC 73102	gil23124797 ref ZP_00106763.11
npCph2c (706 aa)*	Nostoc punctiforme PCC 73102	gil53688000 ref ZP_00109131.21
BphPs	Species	Accession Number
AphB_all2899 (751 aa)	Nostoc sp. PCC 7120	gil17230391 ref NP_486939.11 gil17131993 dbj BAB74598.11 gil25282819 pir AD2168 gil12230474 spl Q9R6X3 PHYB_ANASP gil6521382 dbj BAA88060.11
avAphB (751 aa)	Anabaena variabilis ATCC 29413	gil53763465 ref ZP_00158568.21
atBphP1_agp1 (745 aa)	Agrobacterium tumefaciens str. C58, Cereon	gil15157115 lbl AAK87748.11 gil15889282 ref NP_354963.11 gil25282817 pir C97599 gil51243765 lbl AAT99575.11

atBphP2_agp2 (850 aa)	Agrobacterium tumefaciens str. C58 Dpont and Cereon	gil17936048 ref NP_532838.1 gil17740630 gb AAL43154.1 gil15157306 gb AAK87910.1 gil25522688 pir AD2842) gil25520351 pir E97619 gil15889444 ref NP_355125.1
atBphP3 (736 aa)	Agrobacterium tumefaciens str. C58 Dupont	gil17935879 ref NP_532669.1 gil17740446 gb AAL42985.1 gil25282818 pir AC2821
brBphP (724 aa)	Bradyrhizobium sp. ORS278	gil18378781 gb AAL68700.1
chBphP1 (752 aa)	Cytophaga hutchinsonii	gil48853487 ref ZP_00307657.1
chBphP2 (506 aa)	Cytophaga hutchinsonii	gil48855171 ref ZP_00309331.1
drBphP (755 aa)	Deinococcus radiodurans	gil15807720 ref NP_285374.1 gil6460555 gb AAF12261.1 gil12229721 sp Q9RZA4 BPHY_DEIRA gil7473342 pir D75598
goBphP (744 aa)	Gluconobacter oxydans 621H	gil58040074 ref YP_192038.1 gil58002488 gb AAW61382.1
krBphP (798 aa)	Kineococcus radiotolerans SRS30216	gil67988190 gb EAM75971.1
mmBphP1 (275 aa)	Magnetospirillum magnetotacticum MS-1	gil46203328 ref ZP_00051672.2
mmBphP2 (502 aa)	Magnetospirillum magnetotacticum MS-1	gil46202963 ref ZP_00208733.1
mmBphP3 (251 aa)*	Magnetospirillum magnetotacticum MS-1	gil46205951 ref ZP_00047878.2
paBphP (728 aa)	Pseudomonas aeruginosa PAO1 (Pseudomonas aeruginosa UCBPP-PA14)	gil9950320 gb AAG07504.1 gil15599312 ref NP_252806.1 gil12229707 sp Q9HWR3 BPHY_PSEAE gil11351089 pir B83131 (gil32039295 ref ZP_00137567.1)
pfBphP (745 aa)	Pseudomonas fluorescens PfO-1	gil48731680 ref ZP_00265424.1 gil17980436 gb AAL50631.1
ppBphP1 (ppBphP2, 847 aa)	Pseudomonas putida	gil26990079 ref NP_745504.1 gil24985007 gb AAN68968.1 gil17980440 gb AAL50633.1
ppBphP2 (ppBphP1, 748 aa)	Pseudomonas putida	gil17980438 gb AAL50632.1
ppkBphP2 (ppkBphP1, 755 aa)	Pseudomonas putida KT2440	gil26989080 ref NP_744505.1 gil24983909 gb AAN67969.1
psBphP1 (744 aa)	Pseudomonas syringae	gil19880272 gb AAM00282.1
psBphP2 (993 aa)	Pseudomonas syringae pv. tomato str. DC3000	gil28853086 gb AAO56155.1 gil28869841 ref NP_792460.1
pssBphP1 (745 aa)	Pseudomonas syringae pv. syringae	gil46187520 ref ZP_00127323.2
pssBphP2 (1003 aa)	Pseudomonas syringae pv. syringae	gil23471590 ref ZP_00126919.1
pstBphP1 (745 aa)	Pseudomonas syringae pv. tomato str. DC3000	gil28852346 gb AAO55420.1 gil28869106 ref NP_791725.1
rcPPH_rcPpr (rcPpr, 884 aa)	Rhodospirillum centenum	gil4545094 gb AAD22391.1
rIBphP (885 aa)	Rhizobium leguminosarum	gil16304839 emb CAC95194.1
rpBphP1N (731 aa) RPA1537	Rhodopseudomonas palustris CEA001	gil39933080rvsd
rpBphP2N (758 aa) RPA3015 (phyB1)	Rhodopseudomonas palustris CGA009	gil39936079 ref NP_948355.1 gil39649933 emb CAE28456.1
rpBphP3N (775 aa) RPA3016 (phyB2)	Rhodopseudomonas palustris CGA009	gil39936080 ref NP_948356.1 gil39649934 emb CAE28457.1
rpBphP4N (770 aa) RPA1490 (phyB4)	Rhodopseudomonas palustris CGA009	gil39648411 emb CAE26932.1 gil39934562 ref NP_946838.1
rpBphP5N (759 aa) RPA0122 (phyB3)	Rhodopseudomonas palustris CGA009	gil39652824 emb CAE25566.1 gil39933199 ref NP_945475.1
rpBphP6N (845 aa) RPA0990 (phyB5)	Rhodopseudomonas palustris CGA009	gil39647913 emb CAE26433.1 gil39934065 ref NP_946341.1
rrBphP (856 aa)	Rhodospirillum rubrum	gil48763143 ref ZP_00267699.1
rsBphP1 (1016 aa) rsBphP1a (931 aa)	Rhodobacter sphaeroides 2.4.1	gil17980444 gb AAL50635.1 AF418998_1 gil46191598 ref ZP_00206893.1

rsBphP2 (708 aa)*	Rhodobacter sphaeroides 2.4.1	gil46192868 ref ZP_00005865.2
toCphA (767 aa)	Tolypothrix sp. PCC 7601	gil18642520 gb AAL76159.1 AF309559_1
toCphB (765 aa)	Tolypothrix sp. PCC 7601	gil18642523 gb AAL76161.1 AF309560_1
xaBphP (765 aa)	Xanthomonas axonopodis pv. citri str. 306	gil21110730 gb AAM39123.1 gil21245005 ref NP_644587.1
xcBphP (634 aa)	Xanthomonas campestris pv. campestris str. ATCC 33913	gil21233571 ref NP_639488.1 gil21115433 gb AAM43370.1
FphPs		
afFPH1 afPHY1 afBphP (1116 aa)*	Aspergillus fumigatus	gnl TIGR_5085 contig:5277:a_fumigatus
anFPH1 anPHY1 anBphP (1280 aa)	Aspergillus nidulans	gil40745184 gb EAA64340.1 gil57337632 emb CAI30283.1 gil49133153 ref XP_413145.1
bfFPH1 bfPHY1 (1273 aa)*	Botryotinia fuckeliana	gil39726334 gb AAR30111.1
bfFPH2 bfPHY2 (1221 aa)	Botryotinia fuckeliana	gil39726336 gb AAR30112.1
chFPH1 chPHY1 (1342 aa)	Cochliobolus heterostrophus	gil39656355 gb AAR29900.1
cnFPH1 (cnPHY1) (1871 aa)	Cryptococcus neoformans var. neoformans B-3501A and JEC21	gil50255271 gb EAL18006.1 gil57229994 gb AAW46396.1
gmFPH1 (gmPHY1) (1469 aa)	Gibberella moniliformis	gil39726362 gb Y456036.1
gzFPH1 (gzPHY1) (1525 aa)	Gibberella zeae	gil42549793 gb EAA72636.1 gil46128461 ref XP_388784.1
ncFPH1 ncPHY1 (ncBphP1) (1536 aa)	Neurospora crassa	gil32407206 ref XP_324191.1 gil28921883 gb EAA31157.1
ncFPH2p ncPHY2p (1169 aa) ncFPH2a ncPHY2a (1164 aa) ncFPH2b ncPHY2b (1022 aa) ncFPH2 ncPHY2 (1183 aa)	Neurospora crassa	Jay Dunlap, personal communication gil40317045 tpg DAA02216.1 gil32410329 ref XP_325645.1 gil28921509 gb EAA30814.1
umFPH1 umPHY1 (1572 aa)	Ustilago maydis	gil46100754 gb EAK85987.1 gil49079394 ref XP_403347.1

Phr Family (Phytochrome-related GAF Proteins)*

Phrs	Species	Accession Number
all0729 (1645 aa)	Nostoc sp. PCC 7120	NP_484772.1; gil25533585 pir AG1897
all1069_pixJ1 (1102 aa)	Nostoc sp. PCC 7120	NP_485112.1; gil25529760 pir AB1940
all1280 (941 aa)	Nostoc sp. PCC 7120	NP_485323.1; gil25532168 pir AE1966
all2239 (1707 aa)	Nostoc sp. PCC 7120	NP_486279.1; gil25534491 pir AH2085
all3691_(2021 aa)	Nostoc sp. PCC 7120	NP_487731.1; gil25531683 pir AD2267
all4261 (1036 aa)	Nostoc sp. PCC 7120	NP_488301.1; gil25533262 pir AF2338
alr1966 (879 aa)	Nostoc sp. PCC 7120	NP_486006.1; gil25534456 pir AH2051
alr2279 (1299 aa)	Nostoc sp. PCC 7120	gil25534495 pir AH2090 gil17229771 ref NP_486319.1 gil17131370 dbj BAB73978.1
alr3120 (1286 aa)	Nostoc sp. PCC 7120	NP_487160.1; gil17132215 dbj BAB74819.1
alr3356 (179 aa)	Nostoc sp. PCC 7120	NP_487396.1; gil25365074 pir AE222
alr5272 (751 aa)	Nostoc sp. PCC 7120	NP_489312.1; gil25534834 pir AH2464
cikA	Synechococcus elongatus PCC 7942	gil8953946 gb AAF82192.1 AF258464_1
cwCpla (568 aa)	Crocospaera watsonii WH 8501	gil46118425 ref ZP_00175090.2
CyaC_7120 all4963 (1155 aa)	Anabaena sp. PCC 7120	gil25531026 pir AC2426
CyaC_Sppla (568 aa)	Spirulina platensis	gil2575807 dbj BAA22997.1
np433a1 (858 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000160.1
np4847 (651 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000013.1
np5203 (1116 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000108.1
np5387 (940 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000102.1
np542a1 (750 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000098.1
np5466 (750 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000047.1
np601a5 (878 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000098.1
np628a20 (1060 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000009.1
np63417 (1005 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	gblAAAY02000015.1
np6372 (742 aa)	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np64011	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np6446	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np64722	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np648a15	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np65220	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
np656a20	Nostoc punctiformis sp.PCC 73102; Nostoc punctiforme ATCC 29133	
rcaE (655 aa)	Fremyella diplosiphon	gil1401270 gb AAB08575.1 [1401270]
sll0041_pixJ1_taxAY1 (891 aa)	Synechocystis sp. PCC 6803	NP_442716.1; gil15214334 sp Q554451 Y041_SYNY3; gil18181978 dbj BAB83898.1 ; PixJ1
sll1124_plpA (1371 aa)	Synechocystis sp. PCC 6803	NP_440688.1; gil7470836 pir S77521; gil1747498 gb AAB39105.1 ; gil1652446 dbj BAA17368.1

sll1473 (481 aa) Transposon disrupted RcaE Homolog	Synechocystis sp. PCC 6803	NP_442920.1; gil7470091 pir S76820; gil1653821 dbj BAA18732.1
sll1888 (432 aa)	Synechocystis sp. PCC 6803	gil16330793 ref NP_441521.1 gil1653286 dbj BAA18201.1 gil7470844 pir S75640
slr0484 (675 aa)	Synechocystis sp. PCC 6803	NP_442247.1; gil7470847 pir S74399; gil1001174 dbj BAA10317.1
slr0687 (481 aa) PleD Homolog	Synechocystis sp. PCC 6803	NP_440294.1; gil7470785 pir S74934; gil1652049 dbj BAA16974.1
slr1212 (844 aa)	Synechocystis sp. PCC 6803	NP_440714.1; gil7469312 pir S77547; gil1652472 dbj BAA17394.1
slr1393 (974 aa)	Synechocystis sp. PCC 6803	NP_440530.1; gil7470850 pir S75296; gil1652287 dbj BAA17210.1
slr1759 (1462 aa)	Synechocystis sp. PCC 6803	NP_440376.1; gil7470852 pir S75142; gil1652132 dbj BAA17056.1
slr1805 (749 aa)	Synechocystis sp. PCC 6803	NP_441053.1; gil7470853 pir S77175; gil1652814 dbj BAA17733.1
slr1969 (750 aa)	Synechocystis sp. PCC 6803	NP_441517.1; gil7470854 pir S75636; gil1653282 dbj BAA18197.1
tll0569 (940 aa)	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	NP_681359.1; gil22294290 dbj BAC08121.1
tll0899 (729 aa) cikA homolog	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	NP_681689.1; gil22294622 dbj BAC08451.1
tll1282 (1356 aa) Cph2/RcaE-related	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	gil22298825 ref NP_682072.1
thr0911 (1240 aa)	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	NP_681701.1; gil22294634 dbj BAC08463.1
thr0924 (773 aa) Cph2-related	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	NP_681714.1; gil22294647 dbj BAC08476.1
thr1999 (790 aa)	Thermosynechococcus elongatus BP-1 Synechococcus elongatus sp. PCC 7942	NP_682789.1; gil22295725 dbj BAC09551.1
yph1_synp2	Synechococcus sp. PCC 7002	gil401679 sp P32039 YPH1_SYNP2[401679]

* Sequences not used in sequence alignment.

Supplementary Table 2. Plant phytochrome mutant alleles

PhyA	Allele (original name)	Molecular Lesion	Domain	Lost-of-function (LOF)/gain-of-function (GOF)	Reference
AtphyA	phyA-1 (fhy2-1)	null, DNA rearrangement		LOF	(Whitelam et al., 1993)
AtphyA	phyA-2 (fhy2-2)	null, DNA rearrangement		LOF	(Whitelam et al., 1993) (Dehesh et al., 1993; Parks and Quail, 1993; Parks et al., 1996)
AtphyA	phyA-101 (hy8-1)	nonsense null, Q25 stop		LOF	(Dehesh et al., 1993; Parks and Quail, 1993; Parks et al., 1996)
AtphyA	phyA-102 (hy8-2)	nonsense, L1057 stop		LOF	(Dehesh et al., 1993; Kretsch et al., 2000; Parks and Quail, 1993; Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-103-1 (hy8-3); phyA-103-2; phyA-103-3	missense, G727E; missense, G727E; missense, G727E	PAS-A	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-104	missense, P632S	PAS-A	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-105	missense, A893V	HKD(HPT)	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-106	missense, C716Y	PAS-A	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-107	missense, E119K	P2/PAS	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-108	missense, G768D	PAS-B	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-109	missense, G367S	P3/GAF	LOF	(Xu et al., 1995)
AtphyA	phyA-110	missense, R279S	P3/GAF	LOF	(Parks et al., 1996; Xu et al., 1995)
AtphyA	phyA-111	nd		LOF	(Parks et al., 1996)
AtphyA	Lm-2 phyA	missense, M548T	P4/PHY	LOF	(Maloof et al., 2001)
AtphyA	phyA-201 (fre1-1) Ler	nonsense, Q980 stop		LOF	(Nagatani et al., 1993; Reed et

					al., 1994)
AphyA	phyA-202 (fre1-2)	nd		LOF	(Nagatani et al., 1993; Reed et al., 1994)
AphyA	phyA-203 (m10)	missense, V631M	PAS-A	LOF	(Reed et al., 1994)
AphyA	phyA-204 (m20)	nonsense, Q980 stop missense, V631M (same as phyA-203)		LOF	(Reed et al., 1994)
AphyA	phyA-205 (m26)	nd	PAS-A	LOF	(Reed et al., 1994)
AphyA	phyA-206 (m34)	nd		LOF	(Reed et al., 1994)
AphyA	phyA-207 (m35)	nd		LOF	(Reed et al., 1994)
AphyA	phyA-208 (m36)	nd		LOF	(Reed et al., 1994)
AphyA	phyA-209 (g11)	nd		LOF	(Reed et al., 1994)
AphyA	phyA-210 (g12)	chromosome rearrangement		LOF	(Reed et al., 1994)
AphyA	phyA-211 (g18) Col	nd		LOF	(Reed et al., 1994)
AphyA	phyA-300D	missense, V631M (same as phyA-203, phyA-205)	PAS-A	LOF	(Fry et al., 2002)
AphyA	phyA-302-1; -2 Ler	missense, E777K	PAS-B	LOF	(Yanovsky et al., 2002)
AphyA	phyA-401 (eid4)	missense, E229K	P3/GAF	GOF	(Dieterle et al, 2005)
AsphyA	T-phyA-100	missense, C322S	P3/GAF	LOF	(Quail et al., 1995)
AsphyA	T-phyA-101	missense, P169L	P2/PAS	LOF	(Quail et al., 1995)
AsphyA	T-phyA-102	missense, A203V	P2/PAS	LOF	(Quail et al., 1995)
AsphyA	T-phyA-103	missense, P430S	P3/GAF	LOF	(Quail et al., 1995)
AsphyA	T-phyA-104	missense, R634C	PAS-A	LOF	(Quail et al., 1995)
AsphyA	T-phyA-105	missense, M680I	PAS-A	LOF	(Quail et al., 1995)
AsphyA	T-phyA-106	missense, G707D	PAS-A	LOF	(Quail et al., 1995)

PhyB	Allele	Molecular Lesion	Domain	Lost-of-function (LOF)/gain-of-function (GOF)	Reference
AtphyB	phyB-1 (hy3-BO64) Ler	nonsense, null, Q448 stop		LOF	(Koornneef et al., 1980; Reed et al., 1993; Somers et al., 1991)
AtphyB	phyB-2 (hy3-V197)	nd		LOF	(Koornneef et al., 1980)
AtphyB	phyB-3 (hy3-d504)	nd		LOF	(Koornneef et al., 1980)
AtphyB	phyB-4 (hy3-4-117)	missense, H283Y	P3/GAF	LOF	(Koornneef et al., 1980; Reed et al., 1993)
AtphyB	phyB-5 (hy3-8-36) Ler	nonsense, W552 stop		LOF	(Koornneef et al., 1980; Reed et al., 1993; Somers et al., 1991)
AtphyB	phyB-6 (hy3-548)	nd		LOF	(Koornneef et al., 1980; Reed et al., 1993; Somers et al., 1991)
AtphyB	phyB-7 (hy3-1053)	nd		LOF	(Koornneef et al., 1980; Reed et al., 1993; Somers et al., 1991)
AtphyB	phyB-8 (hy3-M4084)	nd		LOF	(Koornneef et al., 1980; Reed et al., 1993; Somers et al., 1991)
LephyA	fri1, fri2	A to T substitution at first intron splicing site		LOF	(Lazarova et al., 1998a)
AsphyA	T-phyA-107	missense, A715V	PAS-A	LOF	(Quail et al., 1995)
AsphyA	T-phyA-108	missense, C716Y	PAS-A	LOF	(Quail et al., 1995)
AsphyA	T-phyA-109	missense, T866I	HKD(HPT)	LOF	(Quail et al., 1995)
PsphyA	phyA-3D (AF05)	missense, A194V	P2/PAS	GOF	(Weller et al., 2004)
PsphyA	phyA-1 (fun1-1)	nonsense, W558 stop		LOF	(Weller et al., 2004)
PsphyA	phyA-2 (fun1-2)	nonsense, Q59 stop		LOF	(Weller et al., 2004)

AtphyB	phyB-9 (hy3-EMS142)Col	nonsense, null, W397 stop	LOF	(Reed et al., 1993)
AtphyB	phyB-10 (hy3-464-19)	T-DNA insert	LOF	(Reed et al., 1993)
AtphyB	phyB-11 (EMS 81S-53) Col	nd	LOF	(Krall and Reed, 2000)
AtphyB	phyB-12 (EMS 100) Col	nd	LOF	(Krall and Reed, 2000)
AtphyB	phyB-13 (EMS 108) Col	missense, S134G	P2/PAS	LOF
AtphyB	phyB-14 (EMS 226) Col	promotor mutation		LOF
AtphyB	phyB-15 (EMS 235) Col	missense, I208T	P2/PAS	LOF
AtphyB	phyB-16 (Ep3A) Col, gl1-	nd		LOF
AtphyB	phyB-17 (eaf-7) Col	nd		LOF
AtphyB	phyB-18 (D8) Col	insertion of A's at 1048		LOF
AtphyB	phyB-19 (D18) Col	missense, D1040V	HKD(ATP)	LOF
AtphyB	phyB-20 (E11) Col, (gl1-?)	nd		LOF
AtphyB	phyB-21 (B108H) Col, gl1	nd		LOF
AtphyB	phyB-22 (18-2e4-8) Col, phyA-211	nd		LOF
AtphyB	phyB-23 (18-2e8-8) Col, phyA-211	nd		LOF
AtphyB	phyB-24 (18-2e10-15) Col, phyA-211	nd		LOF
AtphyB	phyB-25 (E17-5) Col, pocA108	nd		LOF
AtphyB	phyB-26 (C9A) Col	nd		LOF
AtphyB	phyB-27 (C16B) Col	nd		LOF
AtphyB	phyB-28 (H'2) Ler	nonsense, DG in codon 991, adds 4 missense then stop	DHKRD	LOF
AtphyB	phyB-29 (L14) Ler	nd		LOF
AtphyB	phyB-30 (L15-3) Ler	nd		LOF
AtphyB	phyB-31 (FN-J) Ler	nd		LOF
AtphyB	phyB-32 (313s708) Ler, shy3-1	nd		LOF
AtphyB	phyB-33 (313s1-8) Ler, shy3-1	nd		LOF
AtphyB	phyB-34 (M1-16) Ler	nd		LOF

AtphyB	phyB-35 (ga-86) Ler, ga1-3	missense, G118R	P2/PAS	LOF	(Krall and Reed, 2000)
AtphyB	phyB-101	missense, E812K	PAS-B	LOF	(Bradley et al., 1996; Chen et al., 2003; Elich and Chory, 1997; Kircher et al., 2002)
AtphyB	phyB-102	missense, S349F	P3/GAF	LOF	(Bradley et al., 1996)
AtphyB	phyB-103	null, splicing mutant		LOF	(Bradley et al., 1995)
AtphyB	phyB-104	nonsense, W397 stop		LOF	(Bradley et al., 1996)
AtphyB	phyB-401 (ohr1); Ler	missense, G564E	P4/PHY	GOF	(Kretsch et al., 2000)
AtphyB	phyB-501 (oop1); Col-2	nonsense, Q905stop	DHKRD	LOF	(Salome et al., 2002)
AtphyB	T-phyB-101 (37-3)	missense, A750V	PAS-A	LOF	(Kircher et al., 2002; Wagner and Quail, 1995)
AtphyB	T-phyB-102 (35-4)	missense, G767E	PAS-A	LOF	(Wagner and Quail, 1995)
AtphyB	T-phyB-103 (38-5)	missense, G767R missense, E812K; (same as phyB-101)	PAS-A	LOF	(Wagner and Quail, 1995; Matssuhita et al., 2003)
AtphyB	T-phyB-104 (60-2)		PAS-B	LOF	(Wagner and Quail, 1995)
AtphyB	T-phyB-105 (37-5)	nonsense, R1105 stop	DHKRD	LOF	(Wagner and Quail, 1995)
AtphyB	T-phyB-106 (49-8)	nonsense, R1136 stop	DHKRD	LOF	(Wagner and Quail, 1995)
AtphyB	100lh2	missense, G576E	P4/PHY	LOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	9lh	missense, P581L	P4/PHY	LOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	93lh1	missense, S584F	P4/PHY	LOF (E.S.* personal communication)	Schafer et al., unpublished data

AtphyB	38lh4	missense, A719V	PAS-A	LOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	3lh2	missense, A750V	PAS-A	LOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	86sh3	missense, G515N	P4/PHY	GOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	10sh3	missense, G565S	P4/PHY	GOF (E.S.* personal communication)	Schafer et al., unpublished data
AtphyB	Lm2-phyB	missense, M579T (?) (transgene in phyB-9) missense, V664M (phyA-300D mutation in phyB, transgene in Ler and phyB-101)	P4/PHY	LOF	(Maloof et al., 2001)
AtphyB			PAS-A	WT	(Fry et al., 2002)
AtphyB	T-phyB-GFP-1	missense, G118R	P2/PAS	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-2	missense, C327Y	P3/GAF	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-3	missense, A372T	P3/GAF	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-4	missense, A587T	P4/PHY	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-5	missense, G674D	PAS-A	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-6	missense, A719V	PAS-A	LOF	(Chen et al., 2003)
AtphyB	T-phyB-GFP-7 (same as phyB-101)	missense, E812K nonsense, _G in codon 991, adds 4 missense then stop	PAS-B	LOF	(Bradley et al., 1996; Chen et al., 2003; Elich and Chory, 1997; Kircher et al., 2002)
AtphyB	T-phyB-28-YFP-7		PAS-B	LOF	(Chen et al., 2003; Krall and Reed, 2000)
PsphyB	phyB-1(lv-1)	missense, D57N	P1	LOF	(Weller et al., 1995)
PsphyB	phyB-5 (lv-5)	nonsense, W558 stop		LOF	(Weller et al., 1995)
PsphyB	phyB-6 (lv-6)	missense, R100H	P1	LOF	(Weller et al., 1995)
LephyB1	tri1	nonsense, stop at codon 92		LOF	(Lazarova et al., 1998b)

LephyB2	tri2	nonsense, stop codon at 962 or at 694			(Lazarova et al., 1998b)
LephyB3	tri3	missense, V238F	P2/PAS	LOF	(Lazarova et al., 1998b)
LephyB4	tri4	nonsense, stop at 907		LOF	(Lazarova et al., 1998b)
PhyC	Allele	Molecular Lesion	Domain	Lost-of-function (LOF))/gain-of-function (GOF)	Reference
AtphyC	phyC-1 Ws	null, T-DNA insertion		LOF	(Franklin et al., 2003; Monte et al., 2003)
AtphyC	phyC-2 Col	null, T-DNA insertion		LOF	(Monte et al., 2003)
AtphyC	phyC-3 Col	null, fast-neutron induced gene deletion		LOF	(Monte et al., 2003)
PhyD	Allele	Molecular Lesion	Domain	Lost-of-function (LOF))/gain-of-function (GOF)	Reference
AtphyD	phyD-1	insertion/frameshift at codon 29		LOF	(Aukerman et al., 1997)
PhyE	Allele	Molecular Lesion	Domain	Lost-of-function (LOF))/gain-of-function (GOF)	Reference
AtphyE	phyE-1	frameshift at codon 726		LOF	(Devlin et al., 1998)

* E.S: Eberhard Schafer

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Rockwell, Su, and Lagarias Supplemental Figure 1

aphyA
asphyA3
asphyA4
atphyA
cpphyA
cupphyA
gmpphyA
lephyA
lspphyA
mgphyA
ntpphyA
omphyA
osphyA
pcphyA
psphyA
sbphyA
slphyA1
slphyA3
slphyA4
stphyA
taphyA
zmpphyA1
atphyB
atphyD
gmpphyB
lephb1
lephb2
npphyB
ntpphyB
osphyB
pbphyb1
pbphyb2
sbphyB
slphyB
stphyb1
stphyb2
zmpphyb1
zmpphyb2
atphyC
osphyC
sbphyC
slphyC
taphyC
zmpphyC1
zmpphyC2
lephyE
atphyE
inphyE
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mpphy1
msphy1
paphy1
ppphy0
ppphy1
ppphy2
ppphy3
ppphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA

Rockwell, Su, and Lagarias Supplemental Figure 1

aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drBphP	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	MPDGSTSPREPANSTYSTHEPQSKRHSSPQSVAMPAAPRFHRQHTSSQDHGSSSTPISPA
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphya	-----
cupphyA	-----
gmphyA	-----
lephyA	-----
lsphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

taphya
zmphya1
atphyb
atphyd
gmphyb
lephb1
lephb2
npphyB
ntphyb
osphyb
pbphyb1
pbphyb2
sbphyB
slphyb
stphyb1
stphyb2
zmpphyb1
zmpphyb2
atphyc
osphyc
sbphyc
slphyc
taphyc
zmphyc1
zmphyc2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mphy1
msphy1
paphy1
pphy0
pphy1
pphy2
pphy3
pphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB
chBphP1
chBphP2
drbphp
goBphP
krBphP
mmBphP2
paBphP
pfBphP
ppBphP1
ppBphP2
ppkBphP2
psBphP1
psBphP2
pssBphP1
pssBphP2
pstBphP1

Rockwell, Su, and Lagarias Supplemental Figure 1

rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----
bFPH2	-----
chFPH1	-----
cnFPH1	ASSTGPLSPSIPPGSFVFPIRSVFQGMVHSDDSSNGITEGHQQRKKDGLQRSSGSSPLRS
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphyA	-----
lephyA	-----
lspphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmphyA1	-----
atphyB	-----
atphyd	-----
gmphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntphyb	-----
osphyb	-----
pbphyb1	-----
pbphyb2	-----
sbphyB	-----
slphyb	-----
stphyb1	-----
stphyb2	-----
zmphyb1	-----
zmphyb2	-----
atphyC	-----
osphyC	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

sbphyc	-
slphyc	-
taphyc	-
zmpphy1	-
zmpphy2	-
lephye	-
atphye	-
inphye	-
lephyf	-
acvphy1	-
acvphy2	-
acvphy3	-
appy1	-
cphy2	-
mphy1	-
mphy1	-
msphy1	-
paphy1	-
ppphy0	-
ppphy1	-
ppphy2	-
ppphy3	-
ppphy4	-
psphy1	-
smphy1	-
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drbphp	-
goBphP	-
krBphP	-
mmBphP2	-
paBphP	-
pfBphP	-
ppBphP1	-
ppBphP2	-
ppkBphP2	-
psBphP1	-
psBphP2	-
pssBphP1	-
pssBphP2	-
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
toCphB	-
xaBphP	-
xcBphP	-
anFPH1	-
bfFPH2	-
chFPH1	-
cnFPH1	PALSDAHRFSTDAGALHDEPDAGIQTIAQLLQQDRSAPLKEKGKHQPGVATFVG-KAER

Rockwell, Su, and Lagarias Supplemental Figure 1

gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphyA	-----
lephyA	-----
lsphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyd	-----
gmphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntphyB	-----
osphyB	-----
pbphyb1	-----
pbphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
osphyC	-----
sbphyC	-----
slphyC	-----
taphyC	-----
zmpphyC1	-----
zmpphyC2	-----
lephye	-----
atphye	-----
inphye	-----
lephyf	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
appy1	-----
cpphy2	-----
mcpphy1	-----
mpphy1	-----
msphy1	-----
paphy1	-----
ppphy0	-----
ppphy1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

ppphy2	-
ppphy3	-
ppphy4	-
psphy1	-
smpphy1	-
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drbphp	-
goBphP	-
krBphP	-
mmBphP2	-
paBphP	-
pfbphP	-
ppBphP1	-
ppBphP2	-
ppkBphP2	-
psBphP1	-
psBphP2	-
pssBphP1	-
pssBphP2	-
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
toCphB	-
xaBphP	-
xcBphP	-
anFPH1	-
bfFPH2	-
chFPH1	-MSQSSDQI
cnFPH1	DRNGGGGETLKPSASPASGHGNPITHSSSDSEHQKQQDVAKSSRSEEGTNDSPESSH
gmFPH1	-M
gzFPH1	-MDVPHDKE
ncFPH1	-MET
ncFPH2	-
umFPH1	-
aphC	-
cph2	-
npCph2a1	-
npCph2a2	-
npCph2b	-
arphyA	-
asphyA3	-
asphyA4	-
atphyA	-
cpphyA	-
cupphyA	-
gmpphyA	-
lephyA	-

Rockwell, Su, and Lagarias Supplemental Figure 1

lsphya
mgphya
ntphya
omphya
osphya
pcphya
psphya
sbphya
slphya1
slphya3
slphya4
stphya
taphya
zmphya1
atphyb
atphyd
gmphyb
lephb1
lephb2
npphyB
ntpphyb
osphyb
pbphyb1
pbphyb2
sbphyb
slphyb
stphyb1
stphyb2
zmphyb1
zmphyb2
atphyc
osphyc
sbphyc
slphyc
taphyc
zmphyc1
zmphyc2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mpphy1
msphy1
paphy1
ppphy0
ppphy1
ppphy2
ppphy3
ppphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB
chBphP1
chBphP2
drbphp
goBphP

Rockwell, Su, and Lagarias Supplemental Figure 1

krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xCphP	-----
anFPH1	-MSELPSRS-
bfFPH2	-----
chFPH1	P-----QDGSSAPDNG-----HH
cnFPH1	GSGGTLKQATRTDLPAALQRSSTVKGKVSASG-----LTKPSPSNYRHFPEHHSG
gmFPH1	GQDL-----PNLRTSPSD-----
gzFPH1	GQDISQPEQKDNEEQQHNPSSTLPSSESYPQQQSSSTASSSTFRPSGPDVLPGLQTNTHN
ncFPH1	GMDHTQDTTPTAEGHGQLGNSYQTPDQLAANN-----IKVQDYIDN
ncFPH2	-----
umFPH1	MSSPPQK-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphya	-----
lephya	-----
lsphya	-----
mgphya	-----
ntphya	-----
omphya	-----
osphya	-----
pcphya	-----
psphya	-----
sbphya	-----
slphya1	-----
slphya3	-----
slphya4	-----
stphya	-----
taphya	-----
zmphya1	-----
atphyb	-----
atphyd	-----
gmphyb	-----
lephb1	-----
lephb2	-----
npphyB	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

ntphyb	-----
osphyb	-----
pphyb1	-----
pphyb2	-----
sbphyB	-----
siphyb	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
ospphyC	-----
sbphyC	-----
slphyC	-----
taphyc	-----
zmpphyC1	-----
zmpphyC2	-----
lephye	-----
atphye	-----
inphye	-----
lephf	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
apphy1	-----
cphy2	-----
mphy1	-----
mphy1	-----
msphy1	-----
paphy1	-----
ppphy0	-----
ppphy1	-----
ppphy2	-----
ppphy3	-----
ppphy4	-----
psphy1	-----
smpphy1	-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	----ISPRD--PSPGETPGRDPSTPSTDAGVG-----YSASQDAPSFGAYDRVYP-
bfFPH2	-----MSNIDTVPSKSVVYPSVEEFQVERIFPIRNLVNGKGVTESTSPNTDD
chFPH1	QFSTVSPVAEEPSSPSAATDAIDAATQPS---QRSRASTTET--TGPLSPSTSDRVFP-
cnFPH1	QRERRFSTVNKVNPNSRNSSHPVDASHPPNPELQHPVPRRNTRQQHTQDAEGNNRTSSH
gmFPH1	---ATPTRTTRAASSAAPSEQNSIANSDPP-FSPWSVGSDKQLGYHSAASDISGDRVFP-
gzFPH1	NNNATPTRTTRAASSAAPSEQNSVSNSETP-FSPWSVSSDKQLGYHSAASDVSGDRVFP-
ncFPH1	TALATDLHANDASNNSATADGGSSAITSPTNLSSWSASSDRQLGHGSVQDPE--DRVFP-
ncFPH2	-----MDPMSQP-----IERVFPIR-----LSILESSAFLRN
umFPH1	----ANRRRAPQASAPTLSHTPTSSATAASATASATPMQATPSSLRSPTVSQPFIYP-
aphc	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmpphyA	-----
lephyA	-----
lspphyA	-----
mgphyA	-----
ntpphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyd	-----
gmpphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntpphyB	-----
osphyB	-----
pphyb1	-----
pphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
osphyC	-----
sbphyC	-----
slphyC	-----
taphyC	-----
zmpphyC1	-----
zmpphyC2	-----
lephyE	-----
atphyE	-----
inphyE	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

lephyf	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
appy1	-----
cpphy2	-----
mphy1	-----
mpphy1	-----
msphy1	-----
paphy1	-----
ppphy0	-----
ppphy1	-----
ppphy2	-----
ppphy3	-----
ppphy4	-----
psphy1	-----
smpphy1	-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
pkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-IRSLVSLEPPATSEPSSNKS-----KSPLSPTSGARQFSIIDGHT
bfFPH2	VSSSNSSCRGPTSAREPYDKD-----DILNDSHSDGSSETNFLPPP
chFPH1	-IRSAISVDPSPTPKSQNAQG-----DYFHPFSRTNDPRLATDIR---
cnFPH1	GSRTSLEVDESGMRSLLISDMMSGIVLLGEAGSWGSMGGSGVSGSKGTGGTGTLDAS
gmFPH1	-IRSVISVDPNSSLKIASEDY-----FPTLPERDGRSIPVHIPGAP
gzFPH1	-IRSVISVDPSSSKITNNDY-----FHALPQCDGRGIPVKVPSTS
ncFPH1	-IRSVISVDLAATPPVNDDIRARRRISLSEGYATSAGAGNTATPTRPHASTVPTAKSGAI
ncFPH2	VSDADDLLSVVPVTQQLSN-----QHLSPPSSDGSRCEPLPSAT
umFPH1	-MRSAVSIKPLKNDLSTSHPP-----DAPISAALKASASRPASAEGPK
aphC	-----
cph2	-----
npCph2a1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

npCph2a2	-----	-----
npCph2b	-----	-----
arphyA	-----MSG-----	RPSQS
asphyA3	-----MSSS-----	RPASS
asphyA4	-----MSSS-----	RPASS
atphyA	-----MSG-----	RPTQS
cphyA	-----MSTS-----	RPSQS
cupphyA	-----MSSS-----	RPSQS
gmpphyA	-----MSTS-----	RPSQS
lephyA	-----MSSS-----	RPSQS
lspphyA	-----MSTT-----	RPSQS
mgphyA	-----MSSS-----	RPTQS
ntpphyA	-----MSSS-----	RPSQS
omphyA	-----MASS-----	QPGRS
osphyA	-----MSSS-----	RPTQCSS
pcphyA	-----MSSS-----	RPANS
psphyA	-----MSTT-----	RPSQS
sbphyA	-----MSSS-----	RPAHSSS
slphyA1	-----MASR-----	AQSQS
slphyA3	-----MASP-----	AQSQS
slphyA4	-----MASP-----	AQSQS
stphyA	-----MSSS-----	RPSQS
taphyA	-----MSSS-----	RAA
zmpphyA1	-----MSSL-----	RPAQS
atphyB	MVSGVGGSGGGRGGEEEPSSHTPNRRGG	-----
atphyD	MVS-GGGSKTSGG	EAASSGHRRSRHTSAA
gmpphyB	MLQQ-----	AERRIPPFRRRKSTPH
lephb1	MAS-----	GSRTKHSYHNSSQ
lephb2	MAS-----	GSGSRGKHDRNHQPK
npphyB	MAS-----	GSRTKHSHQSGQGQG
ntpphyB	MAS-----	GSRTKHSHQSGQGQ
osphyB	MAS-----	GSRAT-PTRSPSSARPAAPRHQH
pbphyb1	MAS-----	QSQRQSNQRQHN
pbphyb2	MAS-----	QSQRQSNQPVH
sbphyB	MAS-----	GSRATPTRS-PSSARPEAPRHAHHHH
slphyb	MES-----	-----R
stphyb1	MAS-----	GSRTKHSHHSS
stphyb2	MAS-----	GSRTKHSHHSS
zmpphyb1	MAS-----	GSRATPTRS-PS-SARPEAPRHAHH
zmpphyb2	MAS-----	DSRP-PKRS-PS-ARRVAPRHAHH
atphyC	MSS-----	NTS
osphyC	MSSS-----	RSNNRATCS
sbphyC	MSSPL-----	NNRGTCs
slphyC	MSSS-----	TS
taphyC	MSSS-----	RSNNRPACS
zmpphyC1	MSLP-----	SNNRRTCS
zmpphyC2	MSSP-----	SNNRGTCs
lephyE	MESQSENRRGGGGRT	SLNQNQKQNNNKDS
atphyE	-----	MGFES
inphyE	MENYG-----	KAVTF
lephyf	MSSSSTTN-----	KTNCS
acvphy1	MSST-----	RHSYS
acvphy2	MSSKT-----	MTYSSAAEPRSS
acvphy3	MATP-----	-----
appy1	MSTS-----	KAATYNSS
cphy2	MSAP-----	KKTYs
mphy1	MSTS-----	RMSQSS
mphy1	MSTT-----	KVTYS
msphy1	MSSS-----	KR
paphy1	MSTTRP-----	RAATHSASS
ppphy0	MSTP-----	KKTYSS
ppphy1	MSTP-----	KKTYSS
ppphy2	MSTP-----	KLAYS
ppphy3	MSAP-----	KKTYSS
ppphy4	MSTT-----	KLAYS
psphy1	-----	MASNMRH
smphy1	MSTT-----	KLTYs
aphA	-----	-----
cph1	-----	-----
cwCph1	-----	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drBphP	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----VPDRTTDDFGPFTEQIRGTIDGMGTAEFDALPVGAIQVDGSGVIHRYNRT
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	WTRLRSDSRANSTDYSGGTGLSPESSEAPSSQRMS-----
bFPFH2	YPPIPPDDQIRR-----
chFPH1	RASQGS LTSQSS----- HASQRAWAMRHG----- PG
cnFPH1	IDSGHATGGRGQGDERQVTKASLA AKH GARQTSRQDSVRSFI - QSQAGTTNLQDPNAPTL
gmFPH1	RADTGS DLLRRSD - TVPANYHSRAHSERIDL MRRK----- NTMSGPMSSIQL
gzFPH1	RADIGPD LRRSD - TVPANYHSRAHSERIDL MRRK----- NTMSGPMRSIQL
ncFPH1	DVESRPTVSQS QSSVSQPDGSSV FSSS SAGTM RHKR----- RMNAMTGS LSSVQA
ncFPH2	DRQANPQDSSS-----
umFPH1	-----SSPT-----KFPTFKPPP
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
aphyA	SEGSRRSRHSARI-----IAQTTVDALKHADFEES-----
asphyA3	SSSNRNRQSSQARV-----LAQTTLDAELNAEYEES-----
asphyA4	SSSNRNRQSSRARV-----LAQTTLDAELNAEYEES-----
atphyA	SEGSRRSRHSARI-----IAQTTVDALKHADFEES-----
cphyA	SSNSGRSRHSTRI-----IAQTSV DANVQADFEES-----
cupphyA	SSNSARS KHSARI-----IAQTSIDAKLHAEFEES-----
gmphyA	SSNSR RSRHSARM-----AQATVDAKI HATFEES-----
lephyA	STTSSRS KHSARI-----VAQTSIDAKLHADFEES-----
lsphyA	SNNSGRSRNSARI-----IAQTTVDALKHATFEES-----
mgphyA	SGSSGRSKHSARI-----IAQTTVDALKHADFEES-----
ntpphyA	STTSARS KHSARI-----IAQTTIDAKLHADFEES-----
omphyA	STNSAQS RQSARI-----IAQTSIDAKLDADFEES-----
osphyA	SSSRTRQSSRARI-----LAQTTLDAELNAEYE EY-----
pcphyA	SSNPGRANQNARV-----VL TTD AKI HADFEES-----
psphyA	SNNSGRSRNSARI-----IAQTTVDALKHATFEES-----
sbphyA	SSSRT RQSSQARI-----LAQTTLDAELNAEYEES-----

Rockwell, Su, and Lagarias Supplemental Figure 1

slphya1	STNSGRSKHSARI-----	IAQTIQDAKFHAEEFES--
slphya3	STNSGRSKHSARI-----	IAQTIQDAKLHAEFEES--
slphya4	STNSGRSKHSARI-----	IAQTIQDAKLHAEFEES--
stphya	STTSSRSKHSARI-----	IAQTSIDAKLHADFEES--
taphya	SSSSSRNRQSTQE-----	RVLAQTTLDAELNAEFEES--
zmphya1	SSSSSRTRQSSQA-----	RILAQTTLDAELNAEYEES--
atphyb	EQAQSSGTKSLRPRSN-----	TESMSKAIQQYTVDARLHAVFEQS--
atphyd	EQAQSSANKALRSQNQQPQNH-----	GGGTESTNKAIIQQYTVDARLHAVFEQS--
gmphyb	EQRLSHHSSNNNNNI-----	DSMSKAIAQYTEDG-VHAFVEQS--
lephb1	GQAQSSGTSNMNYKD-----	SISKAIAQYTADARLHAVFEQS--
lephb2	NQSQFSGTSNTNAL-----	KAVAQYTDARLHAAFEQS--
npphyB	VQAQSSGTSNVNYKD-----	SISKAIAQYTADARLHAVFEQS--
ntpphyb	VQAQSSGTSNVNYKD-----	SISKAIAQYTADARLHAVFEQS--
osphyb	HHSQSSGGSTSRAGGGGGGGGGGG-----	AAAAESVSKAVAQYTLDARLHAVFEQS--
pbphyb1	QAAQSSGTSNMROHHHA-----	TESVSKAIAQYTVDAQLHAVFEQS--
pbphyb2	NQAQSSGTSNMROHHHA-----	TESVSKAIAQYTVDAQLHAVFEQS--
sbphyB	HHSQSSGGSTSRAGGGGGGGGTAATATATESVSKAVAQYTLDARLHAVFEQS--	SDTMSRAIAQYTIDARLHAVFEQS--
slphyb	NEGSRTNNNNNSNNP-----	SISKAIAQYTADARLHAVFEQS--
stphyb1	SQAQSSGTSNVNYKD-----	SISKAIAQYTADARLHAVFEQS--
stphyb2	SQAQSSGTSNVNYKD-----	SISKAIAQYTADARLHAVFEQS--
zmpphyb1	HHSQSSGGSTSRAGGG-----	AAATESVSKAVAQYTLDARLHAVFEQS--
zmpphyb2	HHSQSSGGSTSRAGAGGGGG-----	AAATESVSKAVAQYNLDARLHAVFEQS--
atphyc	RSCSTRSRQNSRV-----	SSQVLVDAKLHGNFEES--
osphyc	RSSSARSKHSARV-----	VAQTPMDAQLHAEFEQS--
sbphyc	RSSSARSRHSARV-----	VAQTPVDAQLHAEFEQS--
slphyc	RNSSVRSRHDHV-----	VIQTPVDAQLASDFEQS--
taphyc	RGSSARSKHSERV-----	VAQTPVDARLHAEFEQS--
zmpphy1	RSSSARSKHSARV-----	VAQTPVDAQLHAEFEQS--
zmpphy2	RSSSARSKHSARV-----	VAQTPVDAQLHADFEQS--
lephye	GLNTSSAASNMKNNNA-----	SKAALAQYNADAKLMAEFQES--
atphye	SSSAASNMKPQPQK-----	SNTAQYSVDAALFADFAQS--
inphye	SSSATSNLNTGKA-----	IAQYNADAKLMAEFQES--
lephyf	RGSSARSRRSARV-----	IAQTPVDAKLHVEFEES--
acvphy1	SGGSGKSKHGRR-----	AQTSANAKLYAAYEES--
acvphy2	SSSVVGSKHNRV-----	VVAQTTADAKLHAVFEQAS--
acvphy3	---GGPKTKHSV-----	SVAQTRADARLHAAFEFGSGD
apphy1	AGSSVRSKQRNRA-----	VVQTTVDANVHAVFEQS--
cphy2	STTSAKSKHSVRV-----	AQTTADAALAEAVYEMS--
mphy1	GESTAKTKREVRV-----	AQATADAKLNTAFEAS--
mpphy1	SGSSAKSKHSVRI-----	VQTTADAKLQAVFEES--
msphy1	SQSSGRSSTQTRIQNVR-----	TQASADAKLSTAEFVS--
paphy1	GSVSRSSKHSARV-----	ITQTPVDAKLQAEFEQS--
ppphy0	TSSAKSKAHHSV-----	AQTTADAALQAVFEKS--
ppphy1	TSSAKSKAHHSV-----	AQTTADAALQAVFEKS--
ppphy2	SGSSVSKHSVRV-----	AQTTADAALQAVYEES--
ppphy3	TSSAKSKAHHSV-----	AQTTADAALHAVFEKS--
ppphy4	SGSSVSKHSVRV-----	AQTTADAALQAVYEES--
psphy1	TQSQSTGSNNRRSSTN-----	TNTTNKATAMAQNSDARLLQVFEQS--
smphy1	SGSSAKSKHSVRV-----	AQTTADAALHAVYEES--
aphA	-----	-----
cph1	-----	-----
cwCph1	-----	-----
npCph1	-----	-----
cwCph1a	-----	-----
npCph1a	-----	-----
toCphA	-----	-----
aphB	-----	-----
atBphP1	-----	-----
atBphP3	-----	-----
avAphB	-----	-----
chBphP1	-----	-----
chBphP2	-----	-----
drBphP	-----	-----
goBphP	-----	-----
krBphP	-----	-----
mmBphP2	-----	-----
paBphP	-----	-----
pfBphP	-----	-----
ppBphP1	-----	-----
ppBphP2	-----	-----
ppkBphP2	-----	-----
psBphP1	-----	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	ESRLSGRIPERVIGRNFFTEVAPCTNIPAFSGRFMDGVTSGTLARDFVFDFQMAPVRV
r1BphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----MRLPSLAARPTGPRRTGVPSRLWTGSVRHIPTRGRMCWPAPRPSRR
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----DSSSARPPSNTTGLRRG-----DDHTTFTPSSEDSHPVQE PYE-----
bfFPH2	-----LPKSPKHDYSTEVGEG-----
chFPH1	KTAQRGPQPPIPSQLFNDMSSN-----KSNGSINDDSRSPSFKPEQAPSTKSGIIS
cnFPH1	SPMPSSGSPAEGSQDATVSMEDSANNEKQREQQQEEGEAEQQGEENGQVEQPVAASAE
gmFPH1	DANRHGSSTTPLQLDISTSDN-----ETETEESGPTGHHSVPAAPSGHEADVSSAGQSN
gzFPH1	DANRHGSSTAPLELDISMSDNEADADADTEETEESGVMGHASANVSAGGLEPDASSAGYSS
ncFPH1	DADRYKGK-RPIELVLGDSSE-----EESDGGADGSGDGDLGTIGASSSSGRES
ncFPH2	-----AASSNYTYPSSFNKGNGGDSL
umFPH1	SAPHASHQAHHPEEVHNVTDP-----ATADITVPVNKDESLCDHPEH
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
arphyA	-----GSSFDYSTS VRVTGPV VENQPP-----RSDKVTTTYLHHIQKGKL
asphyA3	-----GDSFDYSKLVEAQRDGPVQ QG-----RSEKVI-AYLQHQIKGKL
asphyA4	-----GDSFDYSKLVEAQRDGPVQ QG-----RSEKVI-AYLQHQIKGKL
atphyA	-----GSSFDYSTS VRVTGPV VENQPP-----RSDKVTTTYLHHIQKGKL
cphyA	-----GNSFDYSSSVRVTSDVSGDQQP-----RSDKVTTAYLHHIQKGKL
cupphyA	-----GDSFDYSSSI RVT SVNTGEQKP-----RSDKVTTAYLHQIQKAKF
gmpphyA	-----GSSFDYSSSVRVT SGADGVNQP-----RSDKVTTAYL-----RGKM
lephyA	-----GDSFDYSSSVRVT SVAGDEEK-----KSDKVTTAYLHQIQKGKF
lspphyA	-----GSSFDYSSWVRVSGV DQQP-----RSNKVTTAYLNHIQRGKQ
mgphyA	-----GGSFDYSTS VRFT GTVGGDIQP-----RSDKVTTAYLHQIQRGKL
ntphyA	-----GDSFDYSSSVRVT SVAGDERKP-----KSDRVTTAYLNQIQKGKF
omphyA	-----GSSFDYSTS VRVTNYPAGLSEP-----RSDKVTTAYLHQIQKGKL
osphyA	-----GDSFDYSKLVEA QR TTGP EQQA-----RSEKVI-AYLHHIQRALK
pcphyA	-----GNSFDYSSSVRVT SAVGENSSI-----QSNKLTTAYLHHIQKGKL
psphyA	-----GSSFDYSSSVRVT SGV DQQP-----RSNKVTTAYLNHIQRGKQ
sbphyA	-----GDSFDYSKLVEAQR STPSEQ QG-----RSGKVI-AYLQHQIKGKL
slphyA1	-----SNEFDYSSSVRG STSGVNQL-P-----KSDKVTS SYLLQIQKGKF
slphyA3	-----SNEFDYSSSVRG STSGVNQL-P-----QSDKVTS SYLLQIQKGKF
slphyA4	-----SNEFDYSSSVRG STSGVNQL-P-----KSDKVTS SYLLQIQKGKF
stphyA	-----GDSFDYSSSVR VTNAEGEQRP-----KSDKVTTAYLHQIQKGKF
taphya	-----SDSF DYSKLVEAQR DTPTVLQE-----GRSEKVIAYLHQIQRGKM
zmphyA1	-----GDSFDYSKLVEAQR STPPEQQ-----GRSGKVIAYLHQIQRGKL
atphyb	-----G-ESGKSF DYSQSLKT TTYGSS-----VPEQQITAYLSRIQRGGY
atphyd	-----G-ESGKSF DYSQSLKT APYDSS-----VPEQQITAYLSRIQRGGY
gmpphyB	-----G-ESGRSF NYSESIRIASES-----VPEQQITAYLVKIQRGGF
lephb1	-----G-ESGKSF DYSQS VKT TQS-----VPERQITAYLT KIQRGGH
lephb2	-----G-ESGKNFDY SQSVRNSTES-----VTEHQITAYLNKMQRGGH
npphyB	-----G-ESGKSF DYSQS VKT TQS-----VPEQQITAYLT KIQRGGH
ntphyb	-----G-ESGKSF DYSQS IKT TQS-----VPEQQITAYLT KIQRGGH
osphyb	-----G-ASGRSF DYT QSLRASP TPS-----SEQQIAAYLSRIQRGGH
pbphyb1	-----G-GSGKSF DYSQS VRT TSQS-----VPEEQITAYLSKIQRGGH
pbphyb2	-----G-GTGRSF DYSKS VRT TNQS-----VPEQQITAYLSKIQRGGH
sbphyB	-----G-ASGRSF DYSQS LRAPPTPS-----SEQQIAAYLSRIQRGGH
slphyB	-----G-ESGKSF DYSQS VKT YTSAES-----VPEQQITAYLSKIQRGGL
stphyb1	-----G-ESGKFDY SQSVKTTQS-----VPERQITAYLT KIQRGGH
stphyb2	-----G-ESGKFDY SQSVKTTQS-----VPERQITAYLT KIQRGGH

Rockwell, Su, and Lagarias Supplemental Figure 1

zmphyb1 -----G-ASGRSF DYSQSLRAPTPS----- SEQQIAAYLSRIQRGGH
 zmphyb2 -----G-ASGRSF DYSQSLRAPTPS----- SEQQIAAYLSRIQRGGH
 atphyc -----ERLF DYSASINLNMPSSCE----- IPSSAVSTYLQKIQRGML
 ospphy -----QRHF DYS SSSVGAANRSA----- TTSNV SAYLQNMQRGRF
 sbphy -----QRNF DYS SSSVSAAIRPS----- VSTSTVSTYHQTMQRGLY
 slphy -----ERVFNYTSSVDLNLLASSSD----- VPSSTVKSYLQKVQRGGL
 taphyc -----QRHF DYS SSSVSALNRSA----- STSSAVSAYI QNMQRGRY
 zmphyc1 -----QRHF DYS SSSVGAANRPSA----- STSTVSTYLQNMQRGRY
 zmphyc2 -----QRHF DYS SSSVGAANRPSA----- STSTVSTYLQNMQRGRY
 lephy -----S-VSGKSFDYSKSVLFPHEA----- NEEEITSYLSRIQRGGL
 atphye -----I-YTGKSFNYSKSVISPPNH----- VPDEHITAYLSNIQRGGL
 inphye -----R-ESGKSFDYSRSVIAPQN----- VTEEEMTAYLSRIQRGGL
 lephyf -----EQQFDYS SSSVNLNSNSTN----- VPSSTVSDYLQKMQRGGL
 acvphy1 -----SESGSF DYSQS VSAGKEG----- ISSQLVTAYLQRMQRGGL
 acvphy2 E-GD-TGGSF DYMRSIEDARGSVL SER----- VPAQAVTAYLQRMQRGGL
 acvphy3 AGAG-GSRAFPDYSKSGMDASSVTS----- VAPEAITAYLQRMQRGGL
 apphy1 -----G-DTGN SF DYT RSI DARS SSES----- IPPQAVTAYLQRMQRGGL
 cpphy2 -----G-DSGDSFDYSKSVGQSAES----- VPAGAVTAYLQRMQRGGL
 mcphy1 -----A-AVGGSF DYT KSVGASLNAGSEA----- IPSSAVTAYLQRMQRGGI
 mpphy1 -----G-ESGDSFDYT KSI NASKSTGES----- VPAQAVTAYLQRMQRGGL
 msphy1 -----SS-SGGDSFDYT KSVTA SLPTEP----- LAAKSVTAYLQRMQRGGI
 paphy1 -----VHSFDYT KSI DISGD SSS----- VPSETVKAYLQRLQKEML
 ppphy0 -----G-DSGDSFDYSKSVSKSTAES----- LPSGAVTAYLQRMQRGGL
 ppphy1 -----G-DSGDSFDYSKSVSKSTAES----- LPSGAVTAYLQRMQRGGL
 ppphy2 -----G-DSGDSFDYSKSVHASKSTGE---N----- VSAQAVTAYLQRMQRGGL
 ppphy3 -----G-VSGDNF DYSKSVSKTAGS----- LHTGAVTAYLQRMQRGGL
 ppphy4 -----G-DSGDSFDYSKSVHASKSTGE---N----- VPALAVTAYLQRMQRGGL
 psphy1 -----G-ESGKSFDYT RSI QVHNRA----- VPEQQITAYLSRIQRGGR
 smphy1 -----G-ESGDSFDYSKSI NAKSTGE---T----- IPAQAVTAYLQRMQRGGL
 aphA -----MRIDVESQNI NVTSLKEAPIHLSQQ
 cph1 -----MATTVQLSDQSLRQLET LAIHTAHL
 cwCph1 -----MISNSHITQDINLKREELQIHLWGK
 npCph1 -----MEMNLQFPGINLISLKEAPIHISSQ
 cwCph1a -----MRNLSLNDYKKYENFDFRYPGS
 npCph1a -----MSQPENTT QATALT NHDRKPIHIPGS
 toCphA -----MVSEFQQAQSINVNSLKEAAIHVC SQ
 aphB -----MNINDITIPFQVDSLNC SKEPIHIPGL
 atBphP1 -----MQRERLEKVMSSHTPKLDSCGAEP IHPGA
 atBphP3 -----MSSHTPKLDSCGAEP IHPGA
 avAphB -----MNINDITIPFHVDSLNCNKEPIHIPGL
 chBphP1 -----MKIKDIVNRDLVNLQNC DQEPIHIPGS
 chBphP2 -----MSKQNYDSKFCGSLP ISFVNQ
 drbphp -----MSRDPLPFF PPLYLG GPEIT TENCEREPIHIPGS
 goBphP -----MDLHLTVQRSLAPEPGCSLEHAVMTSCDREPIH RPD A
 krBphP -----MATGASM QPGSFTPGYGA VDLTT CEREPIHIPGA
 mmBphP2 -----MVDTGSRSE PGLQGC ESEL RLHLSGE
 paBphP -----MTSI -TPVTLANCEDEPIH VPGA
 pfBphP -----MNPQDKEAFELLANCAD EPIR FPG A
 ppBphP1 -----MTYNPQVNLTNC DREPIQIPGS
 ppBphP2 -----MTADNSLADAMERCAQEPIIQVPGS
 ppkBphP2 -----MTGAFS IMTADNSLADAMERCAQEPIIQVPGS
 psBphP1 -----MSQLDKDAFEVLLANCAD EPIIQFPGA
 psBphP2 -----MIEHTLDANPDAAE AALAECAREPIR IPGA
 pssBphP1 -----MSQLDKDAFEVLLANCAD EPIIQFPGA
 pssBphP2 -----MEFTQLI KDM LD----- AKPDAAE AALAECAREPIR VPGA
 pstBphP1 -----MSQLDKDAFEVLLANCAD EPIIQFPGA
 rcPpr QIRMQNAGVPDRYWIFVRKLEDLRPPGP APEAPA HTASV TGEVV DFSV CEQEDIR RVGA
 rlBphP -----MSGTHEPVDTNC DREPIHQLGS
 atBphP2 -----MASTDYHVDTNC DREPIHIPGY
 brBphP -----MPVPLTTPAFGHATLANCE REEQIHLAGS
 rpBphP1N -----VAGHASGSPAFGTADLSNCERE EEEIHLAGS
 rpBphP2N -----MTEGSVARQPD LSTCD DEPIHIPGA
 rpBphP3N -----MSSRSDPGQPMASATDPSGRLA LDLTECDREPIHIPGA
 rpBphP4N -----MHSGLDNSAELRVSDFDP ITLAGGTRTEVLPGA
 rpBphP5N -----MDEADSGGIVTARNVDLSSCDRELVQYPEA
 rpBphP6N -----MPRKV DLTSCDREPIHIPGS
 rrBphP -----MDTVHSTCDQ EPIH VPG L
 rsBphP1 SSNGSPPLLWQPGGYDRPPP CRSLPHVCQNF VRGCLMTISGGTF DPSIC EMEPI ATPGA
 rsBphP1a -----MTISGGTF DPSIC EMEPI ATPGA
 toCphB -----MLQLI YNNFIVSLSPENS PEN----- AAIAPF EVDL TNCDREPIHIPGS
 xaBphP -----MNQPT EPLMDVCAQEPIHIPGL
 xcBphP -----MSTATNPLDLDVCAREPIHIPGL

Rockwell, Su, and Lagarias Supplemental Figure 1

anFPH1	-----LMTTRFRHVVTDDGHAVITGR-----	TVDSFKACEDEPIHPGA
bFPFH2	-----SSEYEARKISQRSQLIPSKSGPPGIAPGEPVSTEERTFFKCEDEPIHPGA	
chFPH1	VDMG-----DLVTHRFRHVSTEGGHMIITGR-----	EGETLQRCEDEPIHLPGA
cnFPH1	AENPDEPAVTMRFEHVVTTEEGHHIVAGR-----	EGRLRRCQDEPIHTPGA
gmFPH1	ADVP---LVTSRFTHVVTDDGHAVITGR-----	DGVLQRCEDEPIHTPGA
gzFPH1	ADIS---HVTARFTHVVTDDGHAVITGR-----	DGVLQRCEDEPIHAPGA
ncFPH1	LDALPETHFAPRFKHIVTNEGHAVITGR-----	DGQLQRCEDEPIHTPGA
ncFPH2	LS-----ETFEYALLADG-SHGVIQKA-----	RRAFTTCDEEPIHIPGA
umFPH1	L-----TTTRFEHVKTDEGHMILTGR-----	GGKLARCEDEPIHIPGA
aphC	-----	
cph2	-----	
npCph2a1	-----	
npCph2a2	-----	
npCph2b	-----	
arphyA	IQPFGCLLALDEK-----TFKVIAYSENAPELLTMASHA-----VPSVGE-----	
asphyA3	IQTFGCLLALDEK-----SFNVIAFSENAPEMLTTVSHA-----VPSVDD-----	
asphyA4	IQTFGCMLALDEK-----SFNVIAFSENAPEMLTTVSHA-----VPSVDD-----	
atphyA	IQPFGCLLALDEK-----TFKVIAYSENASELLTMASHA-----VPSVGE-----	
cpphyA	IQPFGCLLALDDK-----TFKVIAYSENAPEMLTMVSHA-----VPSMGD-----	
cupphyA	IQPFGCLLALDEK-----TFRVIASFENAPDMLTMVSHA-----VPSVGD-----	
gmpphyA	IQPFGCLLAIDEKNHM-----QTCKVIAYSENAPEMLTMVSHA-----VPSVGD-----	
lephyA	IQPFGCLLALDEK-----TLKVIASFENAPEMLTMVSHA-----VPSVGE-----	
lspphyA	IQPFGCLLALDEK-----TCKVVAYSENAPEMLTMVSHA-----VPSVGD-----	
mgphyA	IQPFGCLLAVDEK-----TFKVIAYSENAPEMLTMVSHA-----VPSVGD-----	
ntphyA	IQPFGCLLALDEK-----TFKVIASFENAPEMLTMVSHA-----VPSVGE-----	
omphyA	IQQFGCLLALDEK-----TFRVIAYSENAPEMLTMVSHA-----VPSVGD-----	
osphyA	IQPFGCLLALDEK-----TFNVIASFENAPEMLTTVSHA-----VPSVDD-----	
pcphyA	IQPVGCLLAVDEK-----SFKIMAYSENAPEMLTMVSHA-----VPSVGE-----	
pshphyA	IQPFGCLLALDEK-----TCKVVAYSENAPEMLTMVSHA-----VPSVGD-----	
sbphyA	IQPFGCLLALDEK-----SFNVIASFENAPEMLTTVSHA-----VPNVDD-----	
slphyA1	IQPFGCLLALDDK-----TFRVIASFENAPEMLTMVSHA-----VPSVGD-----	
slphyA3	IQPFGCLLALDDK-----TFRVIASFENAPEMLTMVSHA-----VPSVGD-----	
slphyA4	IQLFGCLLALDDK-----TFRVIASFENAPEMLTMVSHA-----VPSVGD-----	
stphyA	IQPFGCLLALDEK-----TLKVIASFENAPEMLTMVSHA-----VPSVGE-----	
taphya	IQSFGCLLALDEK-----SFNVIASFENAPEMLTTVSHA-----VPSVDD-----	
zmphyA1	IQPFGCLLALDEK-----SFNVIASFENAPEMLTTVSHA-----VPNVDD-----	
atphyB	IQPFGCMIAVDES-----SFRIIGYSENAREMLGIMPOS-----VPTLEK-----	
atphyd	TQPFGLIAVEES-----TTIIGYSENAREMLGLMSQS-----VPSIED-----	
gmpphyB	IQPFGSMIAVDEP-----SFRLGYSNDARDMLGITPOS-----VPSLDDKNAAFAL	
lephb1	IQPFGCMIAVDEA-----SFRIIAYSENACEMSLTPQS-----VPSLDK-----	
lephb2	IQPFGCTIAVEEA-----SFCVIAYSENACEMLDIMPQS-----VPSLEK-----	
nphyB	IQPFGCMIAVDEA-----SFGBIAYSENACEMSLTPQS-----VPSLER-----	
ntphyB	IQPFGCMIAVDEA-----SFNVIAYSENACEMSLTPQS-----VPSLER-----	
osphyB	IQPFGCTLAVADD-----SSFRLLAYSENTADLLSPHH-----SVPSLDS-----	
pbphyb1	IQPFGCMIAVDEG-----SFNVIAYSENAKDMLGLTPQS-----VPSLDK-----	
pbphyb2	IQPFGCMIAADEQ-----SFNVIAYSENAKDMLGLTPQS-----VPSLEK-----	
sbphyB	IQPFGCTLAVADD-----SSFRLLAFSENAAADLLSPHH-----SVPSLDS-----	
slphyB	IQPFGCMLAIDL-----TYRIIAYSQNSVELLGIFTTTTAVPSLEA-----	
stphyb1	IQPFGCMIAVDEA-----SFNVIAYSENACEMSLTPQS-----VPSLEK-----	
stphyb2	IQPFGCMIAVDEA-----SFNVIAYSENACEMSLTPQS-----VPSLEK-----	
zmphyb1	IQPFGCTLAVADD-----SSFRLLAFSENSPDLLSPHH-----SVPSLDS-----	
zmphyb2	IQPFGCTLAVADD-----SSFRLLAFSENAAADLLSPHH-----SVPSLDS-----	
atphyC	IQPFGCLIVVDEK-----NLKVIASFNTQEMGLIPTH-----VPSMEQ-----	
osphyC	VQPFGLLAHVPE-----TFALLAYSENAAEMLDLTPHA-----VPTIDQ-----	
sbphyC	IQPFGCLLAVHPD-----TFALLAYSENAPEMLDLTPHA-----VPTIDQ-----	
slphyC	IQSFGCLIAIDEK-----NFKVIAYSENAPEMLDLTPHT-----VPNIEQ-----	
taphyc	IQPFGCLLAIHPE-----SFALLAYSENAAEILDLTPHA-----VPTIDQ-----	
zmphyC1	IQPFGCLLAVHPD-----TFALLAYSENAPEMLDLTPHA-----VPTIDQ-----	
zmphyC2	IQPFGCLLAVHPD-----TFALLAYSENAPEMLDLTPHA-----VPTIDQ-----	
lephyC	VQPFGMVAIEEP-----TFKIIGYSENCYDMLGFKP-----TKMK-----	
atphyE	VQPFGLIAVEEP-----SFRLGLSDNSSFDFLGLLSPSTSHGFDK-----	
inphyE	IQPFGCMLAIEEP-----SFKIVGFSENCFDLGLLKSGV-----EPPER-----	
lephyf	IQPFGCMIAIDAQ-----NFAVIAYSENAPEMLDLTPHA-----VPSIEQ-----	
acvphy1	VQQFGCLIAVEEE-----TFRVLHMCE-APEMLDVATQA-----VPTMGQ-----	
acvphy2	IQPFGCMLALEEG-----SFNVIAYSENAAEMLDLMPQS-----VPSGVQ-----	
acvphy3	TQAFGCMVVA-----GQKIVAFSENAPEMLEVAA-----	
appy1	IQPFGCMLAIEEP-----SFNVIASFENALEMLDLMQS-----VPSVGMQ-----	
cpphy2	IQTFGCMVAIEEP-----NFCVIAYSENASEFLDLMPQA-----VPSMGEM-----	
mphy1	TQTFGCMVMEEG-----SFNVIASFENAGEMLDLDPQA-----VPSMGQQ-----	
mphy1	TQTFGCMVAVEEL-----TFRVLAYSENAPEMLDLMPQA-----VPCVGQQ-----	

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msphy1	IQSFGCMMAVEPG-----TFRIIAYSENVSEMLGVTPQS----VPTGDHQ-----
phy1	IQPFGCVLAVEEG-----SCAVVGYSENAPEMLDVVGA---HAVPSIGGQQQEG---
pphy0	TQSFGCMIAVEGT-----GFRVIAYSENAPEIFLDLVPOQA---VPSVGEM-----
pphy1	TQSFGCMIAVEGT-----GFRVIAYSENAPEIFLDLVPOQA---VPSVGEM-----
pphy2	MQTFGCMLCVEES-----NFRVIAFSENAPEMLDLMPQA---VPSVGQQ-----
pphy3	TQSFGCMVAVEET-----GFRVIAYSENAPEIFLDLMPQA---VPNIGEI-----
pphy4	VQTFGCMLCVDES-----SFRVIAYSENAPEMLDLMPQA---VPSVGQQ-----
psphy1	IQPFGCVLAVEET-----TFRIIAYSEN-EEMLDLGQAS---VPSMEKPQQ-----
smpy1	VQPFGCMLAVEEG-----SFRVIAFSNDNAGEMLDLMPQS---VPSLGSGQQ-----
aphA	IQP HGVL VLL VLEEP-----GLKILQVSNNTWGLGINAEN-----
cph1	IQP HGVL VVV LQEP-----DLTISQISANCTGILGRSPED-----
cwCph1	IQP HGVL FVL DES-----NLKIVQTSSNTKQFFGIIPQE-----
npCph1	IQP HGVL L VLEEP-----ELKILQVSTNTLKVF GIA PEN-----
cwCph1a	IQP HGVL L VIDIK-----TFTIIQVSENTKRFLGVKPKT-----
npCph1a	IQP HGILL ALST-----OLEIVQVSNN TQVYLCKAPED-----
toCphA	IQP HGVL L VLGE P-----ELNILQISSNTWSVFGILP E-----
aphB	IQP HGVL L VLQE V-----DLTILQVSNNTFNILGRHPEQ-----
atBphP1	IQE HGALL VLSAR-----EFSVVQASDNLANYIGVD-----
atBphP3	IQE HGALL VLSAR-----EFSVVQASDNLANYIGVD-----
avAphB	IQP HGVL L ALQE I-----DLTILQVSNNTFNLLGRHPEQ-----
chBphP1	IQP HGFL IA ITKE-----TWEIRFCSENVIDFIGL SHKQ-----
chBphP2	IQDYGFL L VCDP-----AL IVLQVSDNAEAFTRIS YQS-----
drbphp	IQP HGFL L TADGH-----SGEV LQMSL NAAATFLG QEP TV-----
goBphP	IQP YGFL L VVDS-----TSLKIIGGAGDIEGR LAPD-----
krBphP	IQP HGVL L AVERG-----DHRVVVASANAAGFFGRPLPE-----
mmBphP2	IQP FGALL RL DP-----DGQVSHASANCAGAVL GIPPEA-----
paBphP	IQP HGAL VTL RA-----DGMVLAASENIQ ALLGF VASP-----
pfBphP	IQP HG L L L TSEP-----DL SIIQISANVET L LAR PAQE-----
ppBphP1	IQP HGCL LAC DAS-----ATVVL RHSV NAPQMLGV- AND-----
ppBphP2	IQP HGFL L VLDAT-----DLRVLQASEN VEH WGL PARE-----
ppkBphP2	IQP HGFL L VLDAT-----DLRVLQASEN VEH WGL PARE-----
psBphP1	IQP HGFL LFT L KEP-----ELTILQV SANV QSV LGK VP DQ-----
psBphP2	IQP HGVL L SVAG D-----PLCIEQ VSANC AKS L GLE SAE-----
pssBphP1	IQP HGFL LFT LAEP-----ELTILQV SANV QT VG H VP EQ-----
pssBphP2	IQP HGVL L SVAG D-----PLCIEQ VSANCATEFG MAA DE-----
pstBphP1	IQP HGFL LFT L KEP-----ELTILQV SANV QSV LGK VP DQ-----
rcPpr	IQP WGAVL AVD PR-----DWT VCAAS DNA Q ALL DCAR PP-----
rlBphP	VQP FGFL L AVSS-----DWIVIRASANL AEFL G VTEAN-----
atBphP2	IQP HGCL IAC DNA-----MRMVL RHSE NC ELL GLEG D-----
brBphP	IQP HGILL AV KEP-----DNV VIQ ASINA AEFL NTNS-----
rpBphP1N	IQP HGALL VV SEP-----DHR IIQ ASANA AEFL NL GS-----
rpBphP2N	IQP HGFL L L ALAA-----DMT IVAG SDN LPELT GLA IGA-----
rpBphP3N	IQP HGFL FV SET-----DL RIASV SANVED LL RQPP AS-----
rpBphP4N	IQP HA ALL ALAP A-----DLT IVHA AGAT A SLL GAA AE-----
rpBphP5N	IQP HGAM LT VDE Q-----SDR VL HASANC A FIG K PPE A-----
rpBphP6N	IQP CGCL LAC DA Q-----AVR ITRISE NAGA FF G RET P-----
rrBphP	VQP HGFL VV L DSK-----SGRIA QVTPG IEAVAG VVA QR-----
rsBphP1	IQP HGAL M TARAD-----SGRVAH ASVN L GEIL GL PAAS-----
rsBphP1a	IQP HGAL M TARAD-----SGRVAH ASVN L GEIL GL PAAS-----
toCphB	IQP HGML L ALTE P-----ELTIVQ VSR NT DE ILG VAA TE-----
xaBphP	IQP YGFL L VIEPA-----DGRIVQ ASSTA ADLL GVP MDA-----
xcBphP	IQP YGFL L VIDPA-----DGRIVQ ASSTA ADLL GVP MAA-----
anFPH1	IQSFGAL VAV REEP G-----EQMV V RIV SENS QD ILG Y SP ND-----
bfFPH2	IQQY G ALIAL RY ND Q-----GDLM VR IA SEN AF KIL KY TP EQ-----
chFPH1	VQGF GFL L VAL RD DP-----GNL QVR IV SENS KR IL GR TP KE-----
cnFPH1	VQGF GFL M VL EE DY ET-----GNL EIR QV SE VN IF VIV MSK Y Q-----ETI LR DT LEY-----
gmFPH1	IQT FGAL VAL RE END-----GCF VARY VSEN SRML GY TP KQ-----
gzFPH1	VQT FGVL VAL RE END-----GCF VARY VSEN SRML GY TP KQ-----
ncFPH1	VQGF GLM VV I QE ER D-----GRF IV RF VSEN S KRI I GY TP QE-----
ncFPH2	IQS YGML VAL K LV D ER VAG PS RY LP RI CSEN SA FV CH Y QP SE-----
umFPH1	VQS FGCM I VV RIS PD-----GEM L VR QASEN SAI L GM SP SY-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
aphyA	-----HPVLGIGTDI RSL FTAPS A SAL Q---KALGFD-----VSLLNPILVHCK
asphyA3	-----PPRLGIGTNVRSLFSDQGATA LH---KALGFD-----VSLLNPILVQCK
asphyA4	-----PPRLGIGTNVRSLFSDQGATA LH---KALGFD-----VSLLNPILVQCK
atphyA	-----HPVLGIGTDI RSL FTAPS A SAL Q---KALGFD-----VSLLNPILVHCR

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cphya -----YPVLGIGTDVRTIFTAPSASALL---KALGFGE---VTLLNPILVHCK
 cuphy a -----LPVLGIGTDIRTIIFTAPSGAALQ---KALGFGE---VSLLNPILVHCK
 gmphya -----HPALGIGTDIKTLFTAPSVSGLQ---KALGCAD---VSLLNPILVHCK
 lephy a -----HPVLGIGTDIRTIIFTGPSGAALQ---KALGFGE---VSLLNPVLVHCK
 lsphya -----HPALGIGTDIRTVFTAPSASALQ---KALGFAE---VSLLNPILVHCK
 mgphya -----HPLLGIGTDVRTIFTNPSAAALQ---KAMGYGE---VSLLNPILVHCK
 ntphya -----LPALGIGTDIRTIIFTGPSAAALQ---KALGFGE---VSLLNPVLVHCK
 omphya -----PPLLGIGSDIRTIIFTAPSAAALQ---KALGFGE---VSLLNPILVHCK
 osphya -----PPKLRIGHTNVRSLFTDPGTTALQ---KALGFAD---VSLLNPILVQCK
 pcphya -----HPVLGIGTDVRTIFTAPSAAALQ---KAVGFTD---INLLNPILVHCK
 psphya -----HPALGIGTDIRTVFTAPSASALQ---KALGFAE---VSLLNPILVHCK
 sbphya -----PPKLGIGTNVRSLFTDPGATALQ---KALGFAD---VSLLNPILVQCK
 slphya1 -----LPVIGIGTDIRTIIFTGPSASALQ---KALGFTD---VSLLNPILVHCK
 slphya3 -----LPVIGIGTDIRTIIFTDPSASALQ---KALGFTD---VSLLNPILVHCK
 slphya4 -----LPVIGIGTNIRTIFTGPSASALQ---KALGFTD---VSLLNPILVHCK
 stphya -----HPVLGIGDIRTIIFTGPSGAALQ---KALGFGE---VSLLNPVLVHCK
 taphya -----PPRLDIGTNVRSLFTDQGAAALH---KALGFAD---VSLLNPILVQCK
 zmphy a1 -----PPKLGIGTNVRSLFTDPGATALQ---KALGFAD---VSLLNPILVQCK
 atphy b -----PEI AMGTDVRSLFTSSSILLE---RAF VARE---ITLLNPVWIHSK
 atphy d -----KSEVLTIGTDLRSLFKSSSYLLE---RAF VARE---ITLLNPWIHSN
 gmpyb GPQSVPSSLDDKNDAAFALGTDVRALFTHSSALLLE---KAFARE---ISLMNPWIHSR
 lephb1 -----SEILTGVTDVRTLFTPSSSVLLE---RAFGARE---ITLLNPWIHSK
 lephb2 -----NEILKIGTDVRTLFTPSSSSGLLE---GAFGARE---ITLLNPVWHSK
 npphyB -----PEILTGVTDVRTLFTPSSSVLLE---RAFGARE---ITLLNPWIHSK
 ntphyb -----PEILTGVTDVRTLFTPSSSVLLE---RAFGARE---ITLLNPWIHSK
 osphyb -----SAVPPVSLGADARLLFAPSSAVLLE---RAFAARE---ISLLNPWIHSR
 pbphyb1 -----QEILSDGTDVRTLFRPSSSAMLE---KAFGARE---IILLNPWIHSK
 pbphyb2 -----QEILFVGADVRILFRPSSAVLLE---KAFGARE---ITLLNPWIHSK
 sbphyB -----AAPPVSLGADARLLFSPSSAVLLE---RAFAARE---ISLLNPWIHSR
 slphyb -----VQQRIIAVGTDIRSFLFMSSCVLLE---KAFARE---ITLLNPVWIHSK
 stphyb1 -----CEILTIGTDVRTLFTPSSSVLLE---RAFGARE---ITLLNPWIHSK
 stphyb2 -----CEILTIGTDVRTLFTPSSSVLLE---RAFGARE---ITLLNPWIHSK
 zmphyb1 -----SAPPVSLGADARLLFSPSSAVLLE---RAFAARE---ISLLNPWIHSR
 zmphyb2 -----VALPPVSLGADARLYFSPSSAVLLE---RAFAARE---ISLLNPWIHSR
 atphyc -----REALTIGTDVSKLFSPGCSALE---KAVDFGE---ISILNPITLHCR
 osphyc -----REALAVGTDVRTLFRSHSFVALQ---KAATFGD---VNLLNPILVHAR
 sbphyc -----RDALAVGADVRTLFRSQSSVALH---KAATFGE---VNLLNPILVHAR
 slphyc -----LEALTFGTDVATLFTSSGVVALQ---KAVNSE---LNLLNPILVHSK
 taphyc -----RDALAVGADVRTLFRSQSAVALH---KAAVFGE---VNLLNPILVHAR
 zmphy c1 -----RDALGIGDVVRTLFRSQSSVALH---KAAAFGE---VNLLNPILVHAR
 zmphy c2 -----RDALTIGADVRTLFRSQSSVALH---KAATFGE---VNLLNPILVHAR
 lephy e -----LGLIGVDARNLFTPSSGDSL A---KVMASRE---ISLLNPVWHSR
 atphy e -----VKGLIGIDARTLFTPSSGASLS---KAASFTE---ISLLNPVLVHSR
 inphye -----MSLIGIDARTLFTLSSRASLA---KAVASRE---ISLLNPVWHSK
 lephy f -----QEALTFGTDVRKLFRSSGASALE---KAVSFGE---LSLLNPILVHCK
 acvphy1 -----YSRLCIGADVRTLLSPASASALD---RVIGVVD---VSMFNPI TVQSR
 acvphy2 -----VLVLGIGTDARTLFTYASA AALE---KASGAVD---VSMLNPI TVHCR
 acvphy3 -----GLGTDLRMLFTQGSTAALD---QA VKEED---LSSVNPLV LQSC
 apphy1 -----EILGIGSDARSYFTPSSAALE---KAVGAVD---VSMLNPI TIHSK
 cphy2 -----DVLGIGTDIRTLFTPSSGAALE---KAATQD---ISLLNPITVHCR
 mcpphy1 -----SLIAVGTDIRTLFTSASVSLLE---KAAMATD---VSMVNPNVSLQSR
 mpphy1 -----DVLGIGTDARTLFTNSASA VALE---KAAGALD---VSMFNPI SVQCK
 msphy1 -----NAIGIGTDVRSLLSPSSV VVE---KAVAAND---VSMMNPI AVYSL
 paphy1 -----GGGGGGLLRIGMDARTLFPK PASA AALQ---KAATFAD---MHLVNP IFVRCN
 ppphy0 -----DTLRIGTDVRTLFTASSVASLE---KAAEAQE---MSLLNPITVNC R
 ppphy1 -----DTLRIGTDVRTLFTASSVASLE---KAAEAQE---MSLLNPITVNC R
 ppphy2 -----EVLGIGTDARTLFTPSSAAALE---KCAGTV D---VTMLNPISVHCR
 ppphy3 -----NTLGIGTDVRTLFTPSSAALE---KA AETQE---ISLLNPITVYCR
 ppphy4 -----EVLGIGTDARTLFTPSSAAALE---KCAGAVD---VTMLNPISVHCR
 psphy1 -----DVL TIGTDVRTLFTAASAH SLE---KAAVAQE---ISLMNPVWHSK
 smphy1 -----DVL TIGTDARTLFT- AAASALE---KAAGAVD---LSMLNPVWQSK
 aphA -----ILQKKLEDLLDSFQIERIQ---SGLSSGN---LEFINPTK IWR
 cph1 -----LLGRTLGEVFDSFQIDPIQ---SRLTAGQ---ISSLNPSKLWAR
 cwCph1 -----IVNLTLDDIFDSFQIEQLK---IGLENNN---LDFINPTK IWR
 npCph1 -----MLHKKLEDLLDPFQIERIK---TGLSGEN---LDFINPTK VWR
 cwCph1a -----LLGKPLTYLMLKQIKNIK---NILENN---NHFVDI K LKKK
 npCph1a -----LLGRPLSYLLEPQPVEIVK---QCLVKK---VGSANAFKV LIN
 toCphA -----VLQKKLEDLLDPFQIERIK---AGILEGN---LDYINPTK IWR
 aphB -----LLNQHLSCLLEAEQLSLLK---DCLAQED---LQIINPLEFI IK
 atBphP1 -----LPIGAVATEANLPFISVLS---AWYSGEE---SNFRYAWA---
 atBphP3 -----LPIGAVATEANLPFISVLS---AWYSGEE---SNFRYAWA---
 avAphB -----LLNQHLSCLLEAEQINLLQ---DCLTQED---LQIINPLEFI IK

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chBphP1 -----LLGKKITEIFDDIFFGKVI-----QCKD---YAVGESKLIQGK
 chBphP2 -----FIDKNLKELLTADSFQLQ--EKLSSKAQ---KRFTCTLEFYGG
 drBphP -----LRGQTLAALLPEQWPALQA--ALPPGCPD---ALQYRATLDWP-
 goBphP -----WLGRLPLADILKIPESRLHD--EKRPSLSD---LRVAGL----
 krBphP -----VLSSSLADLLGADLTERVR---GADLLDN---LDEVLHARLPGP
 mmBphP2 -----LLGQIPGPLGGLVGLDEL---TPLGGFP---ILRTKAFTA---
 paBphP -----GSYLTDQEQQVGPEVLRML---EELTGN---GPWSNSVETRI-
 pfBphP -----LIGQPLQSLIGDAHAQVR---EALQQAA---LSDAPPLHFRL-
 ppBphP1 -----INGQKLHAVLGDEVTHTRL---NALARTR---DASRPALSFGVT
 ppBphP2 -----LIGHCFADLVHEGFDLHAH---LTRLPEDE--VFPFHIGDVRLR
 ppkBphP2 -----LIGHCFADLVHEGFDLHAH---LTRLPEDE--VFPFHIGDVRLR
 psBphP1 -----LAGQTLDCVLGAGWAEVIR---STSANDS---LVDVPRLLMSV-
 psBphP2 -----LLGQPLSILLSAAHSMLIN---QAYSQPA---MPNSDPIRLTV-
 pssBphP1 -----LLGKGKLCVLGAGWAEVIR---SASAHDs---FIDAQRLLMSI-
 pssBphP2 -----LLGKPLSWLLSPEQSLAD---HAYGHPA---APHIDPIKLTI-
 pstBphP1 -----LAGQTLDCVLGAGWAEVIR---STSANDS---LVDVPRLLMSV-
 rcPpr -----LGRPLGEVLDAGPLAALR---DWLDPRT---SRSWRGEMAR-
 rlBphP -----ALGRPVISLISPEALHAIR---NKLTTLR---GSDVVERIFGI
 atBphP2 -----LNGRTAEDVLGKKLVHDLR---NALTWTG---RTTRPAMLPMAM
 brBphP -----VVGRPLRDLGGDLAQILP---HLNGPLH----LAPMTLRCT
 rpBphP1N -----VLGVPLAEIDGDLLIKLP---HLDPTEA---GMPVAVRCR
 rpBphP2N -----LIGRSAADFVDFSETHNRLT---IALAEPG---AAVGAPIAVGFT
 rpBphP3N -----LLNVPIAHYLTAASAARLT---HALHGGD---PAAINPIRLDV
 rpBphP4N -----LPGTAASTAFSSDQIARLQ---ALATAE---RWIERPQHAFTL
 rpBphP5N -----VIGAPIAAVLGAGWHELLG---SLHRMP---LDSGPVNIARE
 rpBphP6N -----RVGELLADYFGETEAHALR---NALAQSS---DPKRPALIFGW
 rrBphP -----LIGEPLERVLDPRSQARCR---HRIARPE--YPHLIDPFPVRAP
 rsBphP1 -----VLGAPIGEVIGRVNEILLR---EARRS---GSETPETIGSF
 rsBphP1a -----VLGAPIGEVIGRVNEILLR---EARRS---GSETPETIGSF
 toCphB -----FINQPLSRLLDAQQIDFFR---NCLAQED---LTLVNPIELTIA
 xaBphP -----LLGPTYTQVLELPDAQPFA---VDDQPQ---HLLHADVRFPQ
 xcBphP -----LLGMPYTQVLTLPEAQPFA---VDDQPQ---HLMHAEVRFPQ
 anFPH1 -----LFSLPTLCDIFPEDQADNFLD---HVDFVKEEGYDPSVDGPEVFIL
 bfFPH2 -----LFSLSNSFLDLLGVDVREDIFIARV-DHALRAVTKNPSADTKLDIFSM
 chFPH1 -----LFALESFTDILSEEQADNLL---HIDFKDEESNTSNGPEVFTM
 cnFPH1 -----LPESYGGSNSEDGPSVFLLSG-FGEPGSDAEEGVTEGGPETEVR
 gmFPH1 -----LFQLKNFLDILTEEQQDNLLD---HIDFIRDEDADPAINGPEVFSL
 gzFPH1 -----LFQLKNFLDILTEEQQDNLLD---HIDFIRDEDADPAINGPEVFSL
 ncFPH1 -----LFRMNNFLDIFTDEQSENLL---HIDFIRDEDSDPAINGPEVFSL
 ncFPH2 -----LLSLDSFYQVMPNFQRHLFDVQ--LRHIRQGYDSTKKEQEPVVFAF
 umFPH1 -----LFSLPTFLDLFDDDQADLLWD---NIDTLQSSQDLaESGPTVFQL
 aphC -----
 cph2 -----
 npCph2a1 -----
 npCph2a2 -----
 npCph2b -----

aphyA T-----SAKPFYAIIVHRVT-----GSIIIDFEPVKP
 asphyA3 T-----SGKPFYAIIVHRAT-----GCLVVDFEPVKP
 asphyA4 T-----SGKPFYAIIVHRAT-----GCLVVDFEPVKP
 atphya T-----SAKPFYAIIIHRVT-----GSIIIDFEPVKP
 cpphya T-----SGKPFYAIIVHRVT-----GSLIIDFEPVKP
 cupphya T-----SGKPFYAIIVHRVT-----GSLIVDFEPVKP
 gmphya T-----SGKPFYAIIVHRVT-----GSLIVDFEPVKP
 lephya N-----SGKPFYAIIVHRVT-----GSLIIDFEPVKP
 lsphya T-----SGKPFYAIIIHRVT-----GSLIIDFEPVKP
 mgphya T-----SGKPFYAIIVHRVT-----GSLIIDFEPVKP
 ntphya T-----SGKPYYAIIVHRVT-----GSLIIDFEPVKP
 omphya T-----SGKPFYAIIIHRVT-----GSLIIDFEPVKP
 osphya T-----SGKPFYAIIVHRAT-----GCLVVDFEPVKP
 pcphya T-----SGKPFYAIIAHRVT-----GSLIIDFEPVKP
 psphya T-----SGKPFYAIIIHRVT-----GSLIIDFEPVKP
 sbphya T-----SGKPFYAIIVHRAT-----GCLVVDFEPVKP
 slphya1 N-----SGKPFYAIIVHRVT-----RSLVIDFEPVKP
 slphya3 N-----SGKPFYAIIVHRVT-----RSLVIDFEPVKP
 slphya4 N-----SGKPFYAIIVHRVT-----RSLVIDFEPVKP
 stphya N-----SGKPFYAIIVHRVT-----GSLIIDFEPVKP
 taphya T-----SGKPFYAIIVHRAT-----GCLVVDFEPVNP
 zmphya1 T-----SGKPFYAIIVHRAT-----GCLVVDFEPVKP
 atphyb N-----TGKPFYAILHRID-----VGVIDLEPART
 atphyd N-----TGKPFYAILHRVD-----VGILIDLEPART

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gmphyb	T-----	SGKPFYGILHRID-----	VGIVIDLEPART
lephb1	N-----	SGKPFYAILHRVD-----	VGIVIDLEPART
lephb2	N-----	SGKPFYAILHRID-----	VGIVIDLEPART
npphyB	N-----	SGKPFYAILHRVD-----	VGIVIDLEPAKT
ntpphyb	N-----	SGKPFYAILHRVD-----	VGIVIDLEPART
osphyb	V-----	SSNPFYAILHRID-----	VGVIDLEPART
pphyb1	N-----	SGKPFYAILHRID-----	VGIVIDLEPART
pphyb2	N-----	SGKPFYAILHRID-----	VGIVIDLEPART
sphyB	V-----	SSKPFYAILHRID-----	VGVIDLEPART
slphyb	A-----	NGKPFYAILHRID-----	VGIVIDLEPART
stphyb1	N-----	SGKPFYAILHRVD-----	VGIVIDLEPART
stphyb2	N-----	SGKPFYAILHRVD-----	VGIVIDLEPART
zmpphyb1	V-----	SSKPFYAILHRID-----	VGVIDLEPART
zmpphyb2	A-----	SSKPFYAILHRID-----	VGVIDLEPART
atphyC	S-----	SSKPFYAILHRIE-----	EGLVIDLEPVSP
osphyC	T-----	SGKPFYAIMHRID-----	VGLVIDLEPVNP
sbphyC	T-----	SGKPFYAILHRID-----	VGLVIDLEPVNP
slphyC	N-----	SGKPFYAILHRIK-----	VGLVLDLETVNL
taphyc	T-----	SGKPFYAILHRID-----	VGLVIDLEPVNP
zmpphyC1	T-----	SGKPFYAILHRID-----	VGLVIDLEPVNP
zmpphyC2	T-----	SGKPFYAILHRID-----	VGLVIDLEPFPNP
lephye	T-----	THKPFYAILHRID-----	VGIVIDLEPANS
atphye	T-----	TQKPFYAILHRID-----	AGIVMDLEPAKS
inphye	I-----	NQKPFYAVLHRID-----	VGIVIDLEPANS
lephyf	N-----	SGKPFYAILHRIE-----	VGLVIDLEPVDP
acvphy1	S-----	SGKPFYAILHRND-----	VGLVIDLEPIRP
acvphy2	S-----	SSKPFNAIVHRID-----	VGLVIDFEPVRP
acvphy3	G-----	GSAKQFYAMLHRIEDV-----	AGVVIDLEPIEN
appy1	G-----	SGKPFNAVVFHRID-----	VGLVIDFEPLRQ
cphy2	R-----	SGKPLYAIAHRID-----	IGIVIDFEAVKM
mphy1	A-----	AKKPFFAVLHRID-----	VGLVVDFEPVRP
mpphy1	S-----	SGKPFYAIVHRID-----	AGLVVIDIEPVNP
msphy1	A-----	TQKLFFAILHMND-----	VGLVIDLEPISS
paphy1	R-----	SGKPFYAILNRID-----	AGLVVIDFEPVMP
ppphy0	R-----	SGKQLYIAIAHRID-----	IGIVIDFEAVKT
ppphy1	R-----	SGKQLYIAIAHRID-----	IGIVIDFEAVKT
ppphy2	S-----	SGKPFYAILHRID-----	VGLVIDFEPVRS
ppphy3	-----	SKKPLYAIAHRID-----	IGIVIDFEAVNM
ppphy4	S-----	SGKPFYAILHRID-----	VGLVIDFEPVRP
psphy1	N-----	SRKPFYAIVHRID-----	VGMVIDLEPLRT
smphy1	T-----	SAKPFYAIVHRID-----	VGLVMDFEPVKA
aphA	KK-----	GDDYAVFDAVFHRNTE-----	GFLILELEPAIT
cph1	VM-----	GDDFVIFDGVFHRSN-----	GLLVCELEPAYT
cwCph1	VD-----	GDNYVIFDGFVFHRNGE-----	GFLILELEPSYF
npCph1	KK-----	GDEYVVFDAIFHRNIE-----	GFLILELEPAIT
cwCph1a	K-----	YDTQFKGIFHRVQ-----	DSIIGELETFKL
npCph1a	T-----	LYGEIYFDAIAHRTE-----	EAVILELEPTDS
toCphA	KK-----	GDEYVVFDAVFHRNPE-----	GLLILELEPAIS
aphB	S-----	HNESISFDVIAHRSN-----	NLLILELEANLS
atBphP1	-----	EKKLDVSAHRSG-----	TLVILEVEKAGV
atBphP3	-----	EKKLDVSAHRSG-----	TLVILEVEKAGV
avAphB	S-----	HNQSINFDFVIAHRSN-----	GLLILELEANLS
chBphP1	I-----	EDKEFDFTAHQNE-----	DVIILESEIHID
chBphP2	-----	VRTSFLTILHVKE-----	EYILFEFEPSDD
drBphP	-----	AAAGHSLSLTVHRVG-----	ELLILEFEPTEA
goBphP	-----	KDETFSILRHAQG-----	THLLILEPVEA
krBphP	G-----	GSAGADAVEADVVLHVSG-----	ERLVVEIEPSPPP
mmBphP2	-----	HGDALDLAVSPSG-----	EGLLLFEFPTGD
paBphP	-----	GEHLFDVIGHSYK-----	EVFYLEFEIRTA
pfBphP	-----	NGTAFEGLLLHRHQ-----	DVLILELEIHW
ppBphP1	L-----	PNGAAVDIAAHLYK-----	GTAILEFEFAGA
ppBphP2	QG-----	APISALLHMLVHCHD-----	QVLIAEFEPPLR
ppkBphP2	QG-----	APISALLHMLVHCHD-----	QVLIAEFEPPLR
psBphP1	-----	EGVEFEALLHRSQ-----	EALVLELEIQDK
psBphP2	-----	RAVDYNASLSRAG-----	DVLIIIELEPFVE
pssBphP1	-----	NGIEFEALLHHRHQ-----	GVLVLELEIQGK
pssBphP2	-----	GTAHYASLQRAD-----	DVLIIIELEPFVE
pstBphP1	-----	EGVEFEALLHRSQ-----	EALVLELEIQDK
rcPpr	-----	GRRIDIRAHRSG-----	GCVVLDLEPLTA
r1BphP	ALT-----	PDQNSFDLAVHLNE-----	GQVIIEGERCQE
atBphP2	ET-----	SDGRSFDISLHRYK-----	STTIIEFEPSGS
brBphP	VG-----	SPPRRVDCTVHRPS-----	NGGLIVELEPATK

Rockwell, Su, and Lagarias Supplemental Figure 1

rpBphP1N	IG-----	-NPSTEYDGGLMHRPP-----	-EGGLIIELERAGP
rpBphP2N	M-----	-RKDAGFVGWSWRHD-----	-QLVLELEPPQR
rpBphP3N	TP-----	-DGERAFNGILHHRHD-----	-SIVILELEPRDE
rpBphP4N	NAP-----	-DATPIDVIVHHAS-----	-GLLVVELDPRE
rpBphP5N	SFL-----	-GSDQGWHLFAHRCG-----	-GLIILEFEKAEP
rpBphP6N	RDG-----	-LTGRTFDISLHHRHD-----	-GTSIVEFEPAAA
rrBphP	-----	-GGQSFSAVAHAATD-----	-QADLVELWSDDQ
rsBphP1	R-----	-RSDGQLLHLHAFQS-----	-GDYMCLDIEPVRD
rsBphP1a	R-----	-RSDGQLLHLHAFQS-----	-GDYMCLDIEPVRD
toCphB	V-----	-GENARAFDGIIHRS-----	-RLLILEPVLH
xaBphP	RS-----	-APTDHPWVAAWHLYP-----	-EQWLVEIEPRDA
xCBphP	RA-----	-TPPDSAWVAAWHLYP-----	-QQWLVEMEPRDA
anFPH1	TVN-----	-QPNGSTIRVCAIHTNPALN-----	-GLVICEFELEDD
bfFPH2	SV-----	-VAHTGLVNLWCACAIHISKGTD-----	-DLIICEFEPFSD
chFPH1	SIK-----	-IAGHTRTRKLWCACAIHTNEANP-----	-GLVICEFELEED
cnFPH1	STA-----	-SNAGGKRKEWTCAVAAHRPEHRGWNKVDEIGEPIPPPDIILEFELRD	
gmFPH1	SIR-----	-SPKRKSTKLWCACAIHINPAHP-----	-DLIICEFELDED
gzFPH1	SIR-----	-PPKCKSTKLWCACAIHINPAHP-----	-DLIICEFELDDD
ncFPH1	SIR-----	-LPKAFTSVRLWCACAIHVPSRP-----	-ELTICEFELDDD
ncFPH2	SF-----	-SDPDGRLIPCWCAAHYLGGDT-----	-DLFICEFELQDY
umFPH1	RGYDMASYDERVSRGVQRNRWNTWCAGAHIPDRRNDGQAE-----	LTVVLEFELVDD	
aphC	-----	-----	-----
cph2	-----	-----	-----
npCph2a1	-----	-----	-----
npCph2a2	-----	-----	-----
npCph2b	-----	-----	-----
aphyA	YEVPM-----	-----	-----
asphyA3	TEFPA-----	-----	-----
asphyA4	TEFPA-----	-----	-----
atphyA	YEVPM-----	-----	-----
cpphyA	YEGPV-----	-----	-----
cupphyA	YEAPM-----	-----	-----
gmphyA	YEVPM-----	-----	-----
lephyA	YEVPM-----	-----	-----
lsphyA	YEVPM-----	-----	-----
mgphyA	YEVPM-----	-----	-----
ntphyA	YEVPM-----	-----	-----
omphyA	HEVPM-----	-----	-----
osphyA	TEFPA-----	-----	-----
pcphyA	YEVPM-----	-----	-----
psphyA	YEVPM-----	-----	-----
sbphyA	TEFPA-----	-----	-----
slphyA1	YEVPM-----	-----	-----
slphyA3	YEVPM-----	-----	-----
slphyA4	YEVPM-----	-----	-----
stphyA	YEVPM-----	-----	-----
taphyA	TEFPA-----	-----	-----
zmpphyA1	TEFPA-----	-----	-----
atphyb	EDPAL-----	-----	-----
atphyd	EDPAL-----	-----	-----
gmphyb	EDPAL-----	-----	-----
lephb1	EDPAL-----	-----	-----
lephb2	EDPAL-----	-----	-----
npphyB	EDPAL-----	-----	-----
ntphyb	EDPAL-----	-----	-----
osphyb	EDPAL-----	-----	-----
pphyb1	EDPAL-----	-----	-----
pphyb2	EDPAL-----	-----	-----
sbphyB	EDPAL-----	-----	-----
slphyb	EDPAL-----	-----	-----
stphyb1	EDPAL-----	-----	-----
stphyb2	EDPAL-----	-----	-----
zmpphyb1	EDPAL-----	-----	-----
zmpphyb2	EDPAL-----	-----	-----
atphyc	DEVPV-----	-----	-----
osphyc	VDLPV-----	-----	-----
sbphyc	VDVPV-----	-----	-----
slphyc	AETLV-----	-----	-----
taphyc	ADVPV-----	-----	-----
zmpphy1	ADVPV-----	-----	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

zmpphy2	ADVPV-----
lephye	SDPAL-----
atphye	GDPAL-----
inphye	ADPAL-----
lephyf	HEVPV-----
acvphy1	DDASI-----
acvphy2	ADVAW-----
acvphy3	GVVEK-----
appy1	ADITVS-----
cphy2	NDVSV-----
mcphy1	SDPNV-----
mphy1	SDPSV-----
msphy1	SSDSAM-----
paphy1	SDVPV-----
pphy0	DDHLV-----
pphy1	DDHLV-----
pphy2	NDAIV-----
pphy3	NDVTI-----
pphy4	NDAVV-----
psphy1	GDAFM-----
smphy1	SDTRVG-----
aphA	QENIP-----
cph1	SDNLP-----
cwCph1	SRKYP-----
npCph1	QENIP-----
cwCph1a	NDNNK-----
npCph1a	EFEVS-----
toCphA	QENIP-----
aphB	DKTHS-----
atBphP1	GESAE-----
atBphP3	GESAE-----
avAphB	DKNYS-----
chBphP1	NTPKN-----
chBphP2	TDIKG-----
drBphP	WDSTG-----
goBphP	HNLLT-----
krBphP	HTAPV-----
mmBphP2	FSGTH-----
paBphP	DTLSI-----
pfBphP	NFQPR-----
ppBphP1	SIAEP-----
ppBphP2	PADLV-----
ppkBphP2	PADLV-----
psBphP1	AAQAI-----
psBphP2	AAHEQ-----
pssBphP1	DAQSV-----
pssBphP2	TGHGQ-----
pstBphP1	AAQAI-----
rcPpr	RPGEA-----
rlBphP	DRHDA-----
atBphP2	DAQPL-----
brBphP	TTNVA-----
rpBphP1N	PIDLS-----
rpBphP2N	DVAEP-----
rpBphP3N	SRYTN-----
rpBphP4N	PAPEN-----
rpBphP5N	EAAGT-----
rpBphP6N	DQADNP-----
rrBphP	ETTVE-----
rsBphP1	EDGRL-----
rsBphP1a	EDGRL-----
toCphB	QKNYT-----
xaBphP	RLMDV-----
xcBphP	RLLDV-----
anFPH1	HVNPL-----
bfFPH2	EMFFPDEP-----
chFPH1	PLYPL-----
cnFPH1	VYNPLVHPSENAETSTAANSNARSLSPDSTAASVSASGSNSNSNTLSASTRSGERTLDS
gmFPH1	AEYPL-----
gzFPH1	VEYPL-----
ncFPH1	HDYPL-----
ncFPH2	SMHPL-----
	-TSSGHISPAV
	-HNTKNDLPKF
	-VPPNNNTPDL
	-RPVDELTPT
	-RPADEMTPT
	-RPPEEQLPDI
	-ATPAMSDPGN

Rockwell, Su, and Lagarias Supplemental Figure 1

umFPH1	LTNP1STSSPPA-----	TPLDDRESHS
aphC	-----	
cph2	-----	
npCph2a1	-----	
npCph2a2	-----	
npCph2b	-----	
aphyA	-----	
asphyA3	-----	
asphyA4	-----	
atphyA	-----	
cpphyA	-----	
cupphyA	-----	
gmphyA	-----	
lephyA	-----	
lsphyA	-----	
mgphyA	-----	
ntphyA	-----	
omphyA	-----	
osphyA	-----	
pcphyA	-----	
psphyA	-----	
sbphyA	-----	
slphyA1	-----	
slphyA3	-----	
slphyA4	-----	
stphyA	-----	
taphyA	-----	
zmphyA1	-----	
atphyB	-----	
atphyd	-----	
gmphyB	-----	
lephb1	-----	
lephb2	-----	
nphyB	-----	
ntphyB	-----	
osphyB	-----	
pbphyb1	-----	
pbphyb2	-----	
sbphyB	-----	
slphyB	-----	
stphyb1	-----	
stphyb2	-----	
zmphyb1	-----	
zmphyb2	-----	
atphyC	-----	
osphyC	-----	
sbphyC	-----	
slphyC	-----	
taphyC	-----	
zmphyC1	-----	
zmphyC2	-----	
lephyE	-----	
atphyE	-----	
inphyE	-----	
lephyf	-----	
acvphy1	-----	
acvphy2	-----	
acvphy3	-----	
appy1	-----	
cpphy2	-----	
mcphy1	-----	
mphy1	-----	
msphy1	-----	
paphy1	-----	
ppphy0	-----	
ppphy1	-----	
ppphy2	-----	
ppphy3	-----	
ppphy4	-----	
psphy1	-----	

Rockwell, Su, and Lagarias Supplemental Figure 1

smpphy1	-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	PTNT-----LDVVPTIEQMAGSTITINQPLRVLRRAR
bfFPH2	PTRT-----IDNDTVLEERLKSISSGSQPLRVLQIAK
chFPH1	PEDT-----LSSQPTADEFLESTEIKSKPLRLILRSAR
cnFPH1	LTSTLAGGRAGVSAGLGPGTASSDASPGDLGSSASDFTSVPKQEARMGLDGLEMHIPLKEK
gmFPH1	PHDT-----LQSNPTLEEIEDSTEVLSPKPLRLILRSAR
gzFPH1	PHDT-----LQSNPTLEEIEDSTEVLSPKPLRLILRSAR
ncFPH1	PEDT-----LQSNPTTEELTESTAISSKPLRVLRSAR
ncFPH2	PIDT-----LGSDHLDFAATACSIQSFKVQPAFPNPELI
umFPH1	GNGPGLGLAAGWIRPDQPTSSRQDSSPVТИG-TVLSSSNAASSVGPRAGLEGLAYTPSPNE
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
-----	-----
arphyA	-----TAAGALQSYKLA
asphyA3	-----TAAGALQSYKLA
asphyA4	-----TAAGALQSYKLA
atphyA	-----TAAGALQSYKLA
cphyA	-----TAAGALQSYKLA
cupphyA	-----TAAGALQSYKLA
gmpphyA	-----TAAGALQSYKLA
lephyA	-----TAAGALQSYKLA
lspphyA	-----TAAGALQSYKLA
mgphyA	-----TAAGALQSYKLA
ntphyA	-----TAAGALQSYKLA
omphyA	-----TAAGALQSYKLA

Rockwell, Su, and Lagarias Supplemental Figure 1

osphya	-----	TAAGALQSYKLA
pcphya	-----	TAAGALQSYKLAS
psphya	-----	TAAGALQSYKLA
sbphya	-----	TAAGALQSYKLA
slphya1	-----	TAAGALQSYKLA
slphya3	-----	TAAGALQSYKLA
slphya4	-----	TAAGALQSYKLA
stphya	-----	TAAGALQSYKLA
taphya	-----	TAAGALQSYKLA
zmphya1	-----	TAAGALQSYKLA
atphyb	-----	SIAGAVQSQKLAV
atphyd	-----	SIAGAVQSQKLAV
gmphyb	-----	SIAGAVQSQEALV
lephb1	-----	SIAGAVQSQKLAV
lephb2	-----	SIAGAVQSQKLAV
npphyB	-----	SIAGAVQSQKLAV
ntpphyb	-----	SIAGAVQSQKLAV
osphyb	-----	SIAGAVQSQKLVV
pbphyb1	-----	SIAGAVQSQKLAV
pbphyb2	-----	SIAGAVQSQKLAV
sbphyB	-----	SIAGAVQSQKLAV
slphyb	-----	SIAGAVQSQKLAV
stphyb1	-----	SIAGAVQSQKLRS
stphyb2	-----	SIAGAVQSQKLAV
zmphyb1	-----	SIAGAVQSQKLAV
zmphyb2	-----	SIAGAVQSQKLAV
atphyc	-----	TAAGALRSYKLA
osphyc	-----	TATGAIKSYKLA
sbphyc	-----	TAAGALKSYKLA
slphyc	-----	GVSGALMSYKLA
taphyc	-----	TAAGALKSYKLA
zmphyc1	-----	TAAGALKSYKLA
zmphyc2	-----	TAAGALKSYKLA
lephye	-----	LLAGAVQSQKLAV
atphye	-----	LLAGAVQSQKLAV
inphye	-----	TTAGAIKSYKLA
lephyf	-----	
acvphy1	-----	TGGALQSHKLA
acvphy2	-----	AAAGALQSHKLA
acvphy3	-----	KSSAEMAV
appy1	-----	AAG-ALQSHKLA
cphy2	-----	SAAGALQSHKLA
mcpphy1	-----	SAAGAMQSHKLA
mpphy1	-----	SAAGALQSHKLA
msphy1	-----	FSAGAVQSHKLA
paphy1	-----	SAAGALQSYKLA
ppphy0	-----	SAAGALQSHKLA
ppphy1	-----	SAAGALQSHKLA
ppphy2	-----	SSAGVLQSHKLA
ppphy3	-----	SADGALQSHKLA
ppphy4	-----	SSAGALQSHKLA
psphy1	-----	SAAGAVQSQKLAV
smpphy1	-----	SAAGALQSHKLA
aphA	-----	FLSFYH
cph1	-----	FLGFYH
cwCph1	-----	LFKF
npCph1	-----	FLSFYH
cwCph1a	-----	NIDYYK
npCph1a	-----	FLNFHS
toCphA	-----	FLSFYH
aphB	-----	FFRFYH
atBphP1	-----	KLMG
atBphP3	-----	KLMG
avAphB	-----	FFRFYH
chBphP1	-----	DLF
chBphP2	-----	FREVYQ
drbphp	-----	PH
goBphP	-----	WDIFG
krBphP	-----	SYR
mmBphP2	-----	SLKLKSL
paBphP	-----	TSFTL
pfBphP	-----	NVAGTET

Rockwell, Su, and Lagarias Supplemental Figure 1

ppBphP1	-	-
ppBphP2	-	-
ppkBphP2	-	-
psBphP1	-	-
psBphP2	-	-
pssBphP1	-	-
pssBphP2	-	-
pstBphP1	-	-
rcPpr	-	-
r1BphP	-	-
atBphP2	-	-
brBphP	-	-
rpBphP1N	-	-
rpBphP2N	-	-
rpBphP3N	-	-
rpBphP4N	-	-
rpBphP5N	-	-
rpBphP6N	-	-
rrBphP	-	-
rsBphP1	-	-
rsBphP1a	-	-
toCphB	-	-
xaBphP	-	-
xcBphP	-	-
anFPH1	RRKGEAA-	-AMEVF
bffPH2	RKGRHAV-	-GSLEV
chFPH1	KRKGEAA-	-AMEVF
cnFPH1	IESTTNHASPLRALERMRTTVNASNEARSRGRRGRARGGRQRPIRTESGGTGTMDF	
gmFPH1	KRRGEQG-	-AMQVF
gzFPH1	KRRGEQG-	-AMQVF
ncFPH1	RRRGAEAG-	-AMQVF
ncFPH2	SKGFDPST-	-SSVEVI
umFPH1	LHESTHAIHKPLKALSRMRNAEIKS-----	-QTRSRRPAVLPNAGGADGTGILDLF
aphC	-	-MSPTAKPNQSVLNQES
cph2	-	-MNPNRSLLED
npCph2a1	-	-MTSNPEQNFLYSQEES
npCph2a2	-	-MEFLTNQVQSQTQEI
npCph2b	-	-MTSTDKPNGLQQSLEQES
arphyA	KAITRLQS--LPGSMERLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEVTKG-
asphyA3	KAIISKIQS--LPGGSMEVLCNTVVKEVFDLTGYDRVMAYKFHEDD--	-HGEVFSIEITKG-
asphyA4	KAIISKIQS--LPGGSMEVLCNTVVKEVFDLTGYDRVMAYKFHEDD--	-HGEVFAEITKG-
atphya	KAITRLQS--LPGSMERLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEVTKG-
cphyA	KAITRLQS--LPGSMARLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVISEAKPG-
cupphya	KAIARLQS--LPGSNSLERFCDTIVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEITKG-
gmphyA	KAITRLQS--LPGSGNMRLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVIREITKPC-
lephya	KAITRLQS--LPGSGNMRLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEITKG-
lsphya	KAITRLQS--LASGSMERLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVIAEIAKPG-
mgphyA	KAITRLQS--LPSGNMRILCDAMVQEVFELTGYDRVMVYKFHEDD--	-HGEVFSELTKPG-
ntphya	KAITRLQA--LPGSMERLCDTMVQEVFELTGYDRVMVYKFHEDD--	-HGEVVAEITKG-
omphyA	KAIACLQA--LPGGSIERLCDTMVQQVFELTGYDRVMYIKFHEDD--	-HGEVFTIEITKG-
osphyA	KAIISKIQS--LPGGSMEVLCNTVVKELFDLTGYDRVMAYKFHEDD--	-HGEVFAEITKG-
pcphyA	KAVNRLQA--LPGGSMERLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVTAEVTKPG-
psphyA	KAITRLQS--LASGSMERLCDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVIAEIAKPG-
sbphyA	KAIISKIQS--LPGGSMALCANTVVKEVFELTGYDRVMAYKFHEDDE--	-HGEVFAEITKG-
slphyA1	KAITRLQS--LPSGNMVRLVDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEVTKPN-
slphyA3	KAITRLQS--LPSGNMDRLVDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEVTKPN-
slphyA4	KAITRLQS--LPSGNMDRLVDTMVQEVFELTGYDRVMAYKFHEDD--	-HGEVVSEVTKPN-
stphya	KAITRLQS--LPGSMERLCDTMVQEVFELTGYDRVMVYKFHEDD--	-HGEVVSEITKG-
taphya	KAIISKIQA--LPGGSMELLCTNVVKEVFDLTGYDRVMAYKFHEDN--	-HGEVFAEITKG-
zmpphyA1	KAIISKIQS--LPGGSMQALCNTVVKEVFDLTGYDRVMAYKFHEDN--	-HGEVFAEITKG-
atphyb	RAISQLQA--LPGGDIKLLCDTUVVESVRDLTGYDRVMVYKFHEDDE--	-HGEVFAEITKG-
atphyd	RAISHLQS--LPGSDIKLLCDTUVVESVRDLTGYDRVMVYKFHEDDE--	-HGEVVAEAEKRDD-
gmphyb	RAISQLQS--LPSADVKLLCDTUVVESVREL TGYDRVMVYKFHEDDE--	-HGEVVSESKRPD-
lephb1	RAISHLQS--LPGGDIKLLCDTUVVESVREL TGYDRVMVYKFHEDDE--	-HGEVVAEAEKSRS-
lephb2	RAISLLQS--LPGGDIDLCCDTUVVKSVREL TGYDRVMVYKFHDEDE--	-HGEVVAEAEKSRS-
npphyB	RAISHLQS--LPGGDVKLLCDTUVVESVREL TGYDRVMVYKFHEDDE--	-HGEVVAEAEKSRS-
ntphyb	RAISHLQS--LPGGDVKLLCDTUVVESVREL TGYDRVMVYKFHEDDE--	-HGEVVAEAEKSIPD-
osphyb	RAISRLQA--LPGGDVKLLCDTUVVHVREL TGYDRVMVYKFHEDDE--	-HGEVVAEAEKSIPD-
pbphyb1	RAISSQLQS--LPGGDIKLLCDTUVVESVREL TGYDRVMVYKFHEDDE--	-HGEVVAEENKRAD-
pbphyb2	RAISSQLQS--LPGGDIKLLCDTUVVDSVREL TGYDRVMVYKFHEDDE--	-HGEVVAEENKRVD-

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sbphyB RAISRLQA--LPGGDIKLLCDTVVVEHVRLETGYDRVMVYRFHEDE--HGEVVAESRRDN-
 slphyb RAISQLQS--LPGGDVKLLCDTVVESVRQLAAYDRVMVYKFHEDE--HGEVVAESKRAD-
 stphyb1 EGLFLICN-HFLVGTKLKKCDTVVESVRELTYDRVMVYKFHEDE--HGEVVAESKRSD-
 stphyb2 RAISHLQS--LPGGDIKLLCDTVVESVRELTYDRVMVYKFHEDE--HGEVVAESKRSD-
 zmphyb1 RAISRLQA--LPGGDVKLLCDTVVHEVRELTYDRVMVYRFHEDE--HGEVVAESRRDN-
 zmphyb2 RAISRLQA--LPGGDVKLLCDTVVHEVRELTYDRVMVYKFHEDE--HGEVVAESRRDN-
 atphyC KSISRLQA--LPSGNMMLLCDALVKEVSELTYDRVMVYKFHEDE--HGEVIAECCRED-
 ospphy C RAIARLQS--LPSGNLSLLCDVLVREVSELTYDRVMAYKFHEDE--HGEVIAECKRSD-
 sbphyC KAIISRLQS--LPSGNLSLLCDVLVREVSELTYDRVMAYKFHEDE--HGEVISECRSD-
 slphyC KAIISKLQS--LPSQNIPLLCVLVKEVRELTYDRVMVYKFHDDQ--HGEVIGESHSPS-
 taphyc KAIISRLQS--LPSGNLSLLCDVLVREVSELTYDRVMAYKFHEDE--HGEVIAECRRSD-
 zmphyC1 KAIISRLQS--LPSGNLSLLCDVLVREVSELTYDRVMAYKFYED--HGEVISECRSD-
 zmphyC2 KAIISRLQS--LPSGNLSLLCDVLVREVSELTYDRVMAYKFHEDE--HGEVISECRSD-
 lephye RSISRLQS--LPGGDIGVLCDTAVEDVQKLTGYDRVMVYKFHDDN--HGEIVSEIRRSD-
 atphye RAISRLQS--LPGGDIGALCDTIVEDVQRLLTGYDRVMVYQFHEDD--HGEVVSEIRRSD-
 inphye RAISRLQS--LPGGDIGTLCDTVVEDVQKLTGYDRVMVYKFHDD--HGEVVSEIRRSD-
 lephyf KAIKRLQS--LPSGDISLLCDVLVREVSHLTGYDRVMVYKFHEDE--HGEVVAECRTPE-
 acvphy1 KAIARLQS--LPGGDIGLCCDSVVEEVHELTFDRVMAYKFHEDE--HGEVVAEIRRD-
 acvphy2 KAIISRLQA--LPVGIDDLCCDSVVEEVRELTYDRVMAYKFHEDE--HGEVLAEIRRD-
 acvphy3 KPIARVQS--LPGGEIGRLCQVVEEVQEMTYDRVMAYKFHEDE--HGEVVAEVRPD-
 apphy1 KAIISRLQA--LPVGDIGLCCDSVVEVRELTYDRVMAYKFHEDE--HGEVVAEIRRD-
 cphy2 KAITRLQA--LPGGDIGLCCDTVVEEVRELTYDRVMAYKFHEDE--HGEVVAEIRRM-
 mphy1 KAIISRLQS--LPGGDIGLCCDAVVEEVRELTYDRVMAYKFHEDE--HGEVIAEIRRD-
 mphy1 KAIISRLQS--LPGGDIGLCCDTVVEEVRELTYDRVMAYKFHEDE--HGEVVAEIRRD-
 msphy1 KAIISRLQS--LPGGDICGLCDVVVEEVRELTYDRVMAYKFHDDE--HGEVVAEIRRD-
 paphy1 KAIISRLQS--LPGGDIRLLCDTVVQEVRRELTYDRVMAYRFHEDE--HGEVVAEIRRD-
 ppphy0 KAITRLQA--LPGGNIGLCCDTVVEEVRELTYDRVMAYRFHEDE--HGEVVAEIRRAD-
 ppphy1 KAITRLQA--LPGGNIGLCCDTVVEEVRELTYDRVMAYRFHEDE--HGEVVAEIRRAD-
 ppphy2 KAIISRLQA--LPGGDIGLCCDIVERVQEVRELSGYDRVMAYKFHEDE--HGEVLAEIRRD-
 ppphy3 KAIISRLQA--LPGGDIGLCCDIVERVQEVRELTYDRVMAYKFHEDE--HGEVVAEIRRD-
 ppphy4 KAIISRLQA--LPGGDIGLCCDTVVEEVRLQSLGYDRVMAYKFHEDE--HGEVLAEIRRD-
 psphy1 RAISRLQS--LPCGDVGLLCDTVVENVRELTYDRVMVYKFHEDE--HGEVVAEIRRD-
 smphy1 KAIISRLQS--LPGGDIGLCCDTVVEEVRDVTGYDRVMAYKFHEDE--HGEVVAEIRRD-
 aphA LAKASINQ-LQKTANLRDFQCIIQEVRKVTDFRVMLYKFDDG--HGSVIAEELDS-
 cph1 MANAALNR-LRQQANLRDFYDVIEEVRRMTGFDRVMLYRFDENN--HGDVIAEDKRD-
 cwCph1 PSEISI-SQ-LQTNA-NL-TEFCQIIQEV-RKMTGFDRVMLYKFDEDD--HGEVIAEDKLA-
 npCph1 LARASINQ-LEKTANL-RDFCQIVQEV-RKITEFDRVMLYKFDDG--HGSVIAEELKES-
 cwCph1a LFQDAIIN-TGKTN-DLKKL-SAKITEEIRKIKFDRVLIYRFENDD--SGVVAEENKRED-
 npCph1a FASEAIAK-MQRTSNLGEFLHLVAQE-VQKII-SFDRVMVYQFDESE--AGSVVAEVKRED-
 toCphA LARASINQ-LEKTTNLRDFQCIIQEV-RKVTGFDRVMLYKFDDG--HGSVIAEELDS-
 aphB LVKLAMLK-LQGTATTTEISQI-LAQEV-RKITGFDRVMVYRFDEQW--NGKVIAEVKPEY-
 atBphP1 ELTSLAKY-LNSAPSLEDALFRTAQLVSSISGHDRTLIYDFGLDW--SGHVVAEAGSGA-
 atBphP3 ELTSLAKY-LNSAPSLEDALFRTAQLVSSISGHDRTLIYDFGLDW--SGHVVAEAGSGA-
 avAphB LVKLAMLK-LQGATTTEISQI-LAQEV-RKITGFDRVMVYRFDEQW--NGKVIAEVREY-
 chBphP1 MSKQFMDY-MEDSHTLIRLCEL-VASGIKKVTDYDRVMIYRFDKDY--NGEVIAETKQDK-
 chBphP2 QIHEASAA-IQQSQELGESLSIAVAKELKTFSGFDKVMYKFDEDW--NGHVLAEAMEPG-
 drBphP ALRNAMFA-LESAPNLRALAEVATQT-VREL-TGFDRVMLYKFAPDA--TGEVIAEARREG-
 goBphP EIDSTADR-FERC-PDTTSVCRQAAIFRRLTGDRVLVYRFMEDG--TGRVVGESENDA-
 krBphP ATRGAIR-LAGTRGIEGLCERLVREVRVL-TGFDRVMAYRFDAQW--NGEVIAEDRRED-
 mmBphP2 EAIHLHS-PTVREQPNASFQILTETIADLTGYGRVLIYRFADDW--SGEVVAETLRRP-
 paBphP NAQRIIAQ-VQLHN-DTASLL-SNVNTDELRRMTGYDRVMAYRFRHDD--SGEVVAEESRRED-
 pfBphP HLGRMLAR-LQKAQSLQALYDISVKEIQAMTGYDRVLIYRFEEEG--HGQVIAEASDPS-
 ppBphP1 LARTLIAQ-LREIDQTHKLFRDAARFVRAVLGYDRVMIYQLGADG--AGKVVAEKSRS-
 ppBphP2 LVRSFVAS-LQVASSIEDLLQQTVLQLKRITFGFRVKAYRFDAEG--NGQVLAEVVDPG-
 ppkBphP2 LVRSFVAS-LQVASSIEDLLQQTVLQLKRITFGFRVKAYRFDAEG--NGQVLAEVVDPG-
 psBphP1 NMGRMLRQ-LHAAADL-QTLYEV-SVREIQRMTGYDRVLIYRFEEEG--HGQVIAEASAPA-
 psBphP2 IITRVLRN-LQAATLT-ELFDIVHEI-QAL-TGYDRVMIYRFPEG--HGKVVAQALTGP-
 pssBphP1 NMGRMLRQ-LHAASLDL-QTLYEV-SVREI-QKMTGYDRVLIYRFEEEG--HGQVIAEASAPS-
 pssBphP2 IIITRVLRN-LQAATLT-ELFDISVHEI-QAL-TGYDRVMIYRFPEG--HGQVVAQALTGP-
 pstBphP1 NMGRMLRQ-LHAAADL-QTLYEV-SVREI-QRMTGYDRVLIYRFEEEG--HGQVIAEASAPA-
 rcPpr AVEADVAV-IRQASSLTGLAQACARS-SVRLTGFERAIVYRFDAW--HGEVIAEDKVED-
 rLBphP SMRSMSR-LDHTETLEAFFREGARQARALTGFDRVMVYRFDESG--SGEVVAEAA-RAG-
 atBphP2 TARKMVDI-IREADS-SV-EL-SR-TTRLV-KATLG-YDRVMVYRFQEDG--AGKVSEAKQPE-
 brBphP ALDGAFHR-ITSSSLIGL-CDT-ATI-FREITGYDRVMVYRFDEEG--HGEVL-SERRPD-
 rpBphP1N TLAPALER-IRTAGSLR-AL-CDD-TALL-FQQCTGYDRVMVYRFDEQG--HGEVFSERHVP-
 rpBphP2N RTNSAIRR-LQAAE-TLESACAAA-QEVREI-TGFDRVMIYRFASDF--SGEVIAEDRCAE-
 rpBphP3N SVRAIRR-LQTAADLPTAC-WIAASEV-RRITGFDRK-VYQFADW--SGQVIAE-DRSG-
 rpBphP4N LVQSMIRR-ARPAPNL-QGFC-DAMAE-ELRSVTG-FDRVMVYRFARDG--SAVIAEARGPE-
 rpBphP5N EVRADLAA-LQATEGVQ-AFFD-LAVERI-RAFT-GYDRVMAYRF-AEDG--SGQVIAEARRD-
 rpBphP6N LTRQIAR-TKELKSLEEMAAR-PVRYL-QAMLGYHRVMMYRFADDG--SGKVIGEAKRS-
 rrBphP RLPFAIGH-ASRAASIE-DL-CGRAA-ATVADLTG-YERVPMVYRF-AEW--EGEVIAETLNGP-
 rsBphP1 ARQSVIET-FSSAMT-QVEL-CELA-VHGL-QLV-LGYDRVMAYRF-GADG--HGEVIAERRQD-

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rsBphP1a	ARQSVIET-FSSAMTQVELCELAHVGLQLVGYDRVMAYRGADG--HGEVIAERRQD-
toCphB	LVKAALSK-VQNASTLDELQIIVKHVRQMNGFDRVMIYRFDENW--HGTVIAEDKSAH-
xaBphP	EALPLLR-S-IERDAGIDEAAVRRAAKGLRSLMIGFDRVMIYRFDDEEW--NGDVIAREQPE-
xcBphP	EAMPLRS-VERDPGIAEAAVRVAKGLRSLIGFDRVMIYRFDDEEW--NGDIIAEARKPE-
anFPH1	SIVSQIQEQLARADNMEALLDTTSGIVKELTFHRLVYQFDSEF--NGKVVSELVDPTM
bfFPH2	NAMTQAQEQLAACTSVQKLQDVVLGLIFDLTGFFHRVMFYRFDASK--NGCVEAELLNPKA
chFPH1	NIMSVQVQEQLAAAPSLERFLKLVGVVKELTFHRRVMIYQFDQSF--NGRVVTELVDPRA
cnFPH1	AVLGQINDQLVAAPDLDTFLKVAAPGLMQDICRFHRVLIYQFDEQM--NGLVVSELVEWGK
gmFPH1	DIMSQVQEQLSSAPNLNEAFALKLIVGVVKELTFHRRVMIYQFDSSF--NGKVVTELVTSM
gzFPH1	DIMSQVQEQLSSATNEAFALKLIVGVVKELTFHRRVMIYQFDSSF--NGKVVTELVTSM
ncFPH1	DIMSQVQEQLANAPNLEKFALKLIVGVVKELTFHRRVMIYQFDSSF--NGKVVTELVDPMQ
ncFPH2	GMATKIQTQFSEAATVPDLLETIVSIVKEVTRFHRVMVYQFDRDY--NGTVVAELMDPKA
umFPH1	GILSQVNDQLAQADLNEFLKLVGVIIRDITLFSRVMIYQFDEAW--NGQVVCELVWDND
aphC	VLRRITAR-IRQSLELEDDITATTAEVRALLGTDTRVMIYKHFPG--SGQVIAESIYEN-
cph2	FLRNVINK-FHRALTRETQVIVEEARIFLGVDRVKIYKFASDG--SGEVLAEAVNRA-
npCph2a1	LLRRITNR-IRRSLEEEITVTAEVRSLLKTDTRVMIYKHFADG--NGQVIAESIYNN-
npCph2a2	LLHRIASR-IRQSLELQEILSATVAEVRSLFLGTDRIKIYQFQADG--HGLVIAESIQED-
npCph2b	LLHRMIKQ-IRRSLDLQEILTTTTEVRSFLRADRKVYRFDTS--SGEVIAESIHNE-
arphyA	-MEPYLGLHYPATDIPQAARFLFMKNKVRMIVDCNAKHARVLQDE-----KLS
asphyA3	-LEPYLGLHYPATDIPQAARLLFMKNKVRMICDCRARSIVIEAE-----ALP
asphyA4	-LEPYLGLHYPATDIPQAARFLFMKNKVRMICDCRARSIVIEAE-----ALP
atphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIVDCNAKHARVLQDE-----KLS
cphyA	-LQPYLGLHYPATDIPQAARFLFMKNKVRMIVDCRAKHLKVLODE-----KLQ
cupphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMICDCQAKHVKVVQDE-----KLL
gmpphyA	-LEPYLGLHYPATDIPQASRFLFRKNKVRMIVDCHAKHVKVRLQDE-----KLQ
lephyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIDCRAKHKVVQDE-----KLP
lphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIVDCNAKHVKVLQDE-----KLP
mgphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMICHDCRAKHKVQVQDD-----KLP
ntphyA	-LDPYLGLHYPATDIPQAARFLFMKNKVRMIDCDRAKHKVKKVQDE-----KLP
omphyA	-LEPYVGLHYPATDIPQAARFLFMKNKVRMIDCDRANHVKVVQDD-----NLP
osphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIDCDRARSIIIEDE-----SLH
pcphyA	-LEPYFGLHYPATDVPQAARFLFLKNKVRMIDCRANSAPVLQDE-----KLP
psphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIVDCNAKHVKVLQDE-----KLP
sbphyA	-IEPYLGLHYPATDIPQAARFLFMKNKVRMIDCDRAKSVKIEDE-----ALS
slphyA1	-LDSYGLHYPATDIPQAARFLFMKNKVRЛИCDCRAKNVRRVQDE-----KLS
slphyA3	-LDSYGLHYPATDIPQAARFLFMKNKVRЛИCDCRAKNVRRVQDE-----KLS
slphyA4	-LDSYGLHYPATDIPQAARFLFMKNKVRЛИCDCRAKNVRRVQDE-----KLS
stphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRMIDCDRAKHKVVQDE-----KLP
taphyA	-LEPYLGLHYPATDIPQAARFLFMKNKVRЛИCDVRARPIKVIEDE-----ALP
zmphyA1	-IEPYLGLHYPATDIPQAARFLFMKNKVRMIDCDRARSVKIEDE-----ALS
atphyB	-LEPYLGLHYPATDIPQASRFLFKQNRVRMIVDCNATPVLVQDD-----RLT
atphyd	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCNATPVVRVQDD-----RLT
gmpphyB	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHASAVRVVQDE-----ALV
lephb1	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHATPVVRTQDE-----SLM
lephb2	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCTAIPVRVIQDE-----SLM
npphyB	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHATPVRRVQDE-----SLM
ntphyB	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHATPVRRVQDE-----SLM
osphyB	-LEPYIGLHYPATDIPQASRFLFKQNRVRMICHADCHAAPVRVIQDP-----ALT
pphyb1	-LEPYIGLHYSTDIPQASRFLFKQNRVRMIVDCHATPVVRVIQDE-----ALM
pphyb2	-LEPYIGLHYSTDIPQASRFLFKQNRVRMIVDCHAIPVRVIQDE-----ALM
sbphyB	-LEPYLGLHYPATDIPQASRFLFKQNRVRMIAADCHATPVVRVIQDP-----GMS
slphyB	-LEPYLGLHYPATDIPQASRFLFKQNRVRMIVDCHADSVSVVQDE-----RLR
stphyb1	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHATPVVRTQDE-----SLM
stphyb2	-LEPYIGLHYPATDIPQASRFLFKQNRVRMIVDCHATPVVRTQDE-----SLM
zmphyb1	-LEPYLGLHYPATDIPQASRFLFKQNRVRMIAADCHATPVVRVIQDP-----GLS
zmphyb2	-LEPYLGLHYPATDIPQASRFLFKQNRVRMIAADCHAIPVRVIQDP-----GLS
atphyC	-MEPYLGLHYSATDIPQASRFLFMRNKVRMIDCDCSAVPVKVVQDK-----SLS
osphyC	-LEPYLGLHYPATDIPQASRFLFMKNKVRMIDCDCSATPVKIIQDD-----SLT
sbphyC	-LEPYLGLHYPATDIPQASRFLFMKNKVRMIDCDCSATLVKIIQDD-----SLA
slphyC	-LDSYGLHYPATDIPQASRFLFKQNRVRMIDCDRSPSVKVIQDE-----ALT
taphyC	-LEPYLGLHYPATDIPQASRFLFMKNKVRMIDCAASPVKLIQDD-----NLS
zmphyC1	-LEPYLGLHYPATDIPQASRFLFMKNKVRMIDCDCATPVKVIQDD-----SLA
zmphyC2	-LEPYLGLHYPATDIPQASRFLFMKNKVRMIDCDFSATPVLIQDG-----SLA
lephye	-LEPYLGLHYPATDIPQAARFLFKQNRVRMIDCDCNAQPVKVVQSE-----ELK
atphye	-LEPYLGLHYPATDIPQAARFLFKQNRVRMIDCDCNATPVKVVQSE-----ELK
inphye	-LEPYLGLHYPATDIPQAARFLFKQNRVRMIDCDCNAQPVKVLQCE-----ELK
lephyf	-LEPYLGLHYPATDIPQASRFLFMKNKVRMICHDCCLAPPVRIQDP-----RLA
acphy1	-LEPYLGLHYPATDIPQAARFLFMKNRVRMICHDCRLPPVVKLIQDK-----TLS
acphy2	-LEPYLGLHYPATDIPQASRFLFMKNRVRMICHDCRALPPVVRVIQDK-----ELR
acphy3	-LEPYLGLHYSTDVPQASRMFFMKNGVRMIGDCTLPPVRRVQAK-----ELA

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apphy1 -LAPYGLHYPATDIPQASRFLFMKNRVRMICHNCATAVVRVIQDK-----GLR
 cphy2 -LEPYGLHYPATDIPQASRFLFMKNRVRVIADCCASPVKLIQDP-----DIK
 mphy1 -LEPYGLHYPATDIPQAARFLFMKNRVRRIICDCSAPPVKVIQDP-----TMK
 mphy1 -LEPYGLHYPATDIPQASRFLFMKNRVRMICHDCCAQPVQVIQDK-----ELR
 mphy1 -LEPYGLHYPATDIPQASRFLFKNRIRMICDCTSPQVKVVQDS-----RIP
 paphy1 -LEPYGLHYPATDIPQASRFLFMKNRVRMICHDCCAPVNVIQDK-----RLR
 pphy0 -LEPYGLHYPGTDIPQASRFLFMKNKVRRIIACDSAPPVKVIQDP-----TLR
 pphy1 -LEPYGLHYPGTDIPQASRFLFMKNKVRRIIACDSAPPVKVIQDP-----TLR
 pphy2 -LEPYGLHYPATDIPQASRFLFMKNKVRMIGDCFASPVKVIQDK-----DLR
 pphy3 -LEPYGLHYPATDIPQASRFLFMKNRVRMIGDCSAPPKEVQDK-----NLR
 pphy4 -LEPYGLHYPATDIPQASRFLFMKNRVRMIGDCYAPPVKVVQDK-----DLR
 psphy1 -LEPYGLHYPATDIPQASRFLFMQNVRMICHDCMATPVVKVIQSE-----ELM
 smphy1 -LEPYGLHYPATDIPQASRFLFMKNRVRMICHDCSAPPVKITQDK-----ELR
 aphA -LEPYGLHYPESDIPKPARKLFISNSIRVIPNAQQAQAIQMIPALN-----PVSD
 cph1 -MEPYGLHYPESDIPQPARRLFIHNPIRVIPDVYGVAVPLTPAVN-----PSTN
 cwCph1 -LEPYGLHYPASDIPLPARRLFFSNYIRLIPDAKTLGIDLFSKLH-----PLND
 npCph1 -LEPYGLHYPESDIPKPARKLFAANSIRIIPDAYSQPVKLFVNN-----PISD
 cwCph1a -IESYGLHYPYYDIPNPARQFFSKLLRMIPNIHDEPIPIPRLKH-----PLKK
 npCph1a -LSPYGLHYPATDIPAQARELYTRCFLRFLPDLTAEPVKLVPTE-----PTTH
 toCphA -MEPYGLHYPESDIPKPARKLFASNIFIRLIPDAHAEPVQILPINH-----PQSQ
 aphB -LTSYGLNYPASDIPQQARKLYSQNWRLRLIPDAKYQPVPIVPINN-----PLND
 atBphP1 -LPSYGLRFPAGDIPPPQARQLYTINRLRMIIPDVYKPVPIRPEVN-----AETG
 atBphP3 -LPSYGLRFPAGDIPPPQARQLYTINRLRMIIPDVYKPVPIRPEVN-----AETG
 avAphB -LTSYGLHYPASDIPQQARKLYSQNWRLRLIPDAKYQPVPIVPTNH-----PLNN
 chBphP1 -LESFLGLHYPHTDIPVQARELYIKNLLRVIGDVNYKPVPIYTIID-----SEN
 chBphP2 -MESYLGITFPASDIPKQARELYLKNPYRLIPDREYKPSKLYPVIN-----PASS
 drBphP -LHAFLGHRFPASDIPQAQARALYTRHLLRLTADTRAADVPLDPVLN-----PQTN
 goBphP -FPSLMNHHFPASDIPQTQARALYLRNRIRVIPDITYEAAPIRPE-----AGL
 krBphP -LDTFLGLHYPASDIPQAQARLLYTNWMLRIADYDVYVPSPLPHLLD-----PGTG
 mmBphP2 -MQSYQGLHYPFAADIPVIARDLNRQRYIRDALAGSVPLGCD-----PAD
 paBphP -LESYLGQRYPASDIPQAQARLLYIQNPIRLIAADVAYTPMRVFPALN-----PETN
 pfBphP -MEVFNGLFFFASDIPQEPAQARLLYRTNWLRRIIPNADYQPVPLVPKLR-----PDTQ
 ppBphP1 -LESFMGQYFPASDIPQQARALYLRNPPIRVISDAQFNTVAINPVLD-----PSG
 ppBphP2 -YPSYAGLCFPAAIDIPRQARELYRVNRIRVIEDANYQPSPLPATN-----PRTG
 ppkBphP2 -YPSYAGLCFPAAIDIPRQARELYRVNRIRVIEDANYQPSPLPATN-----PRTG
 psBphP1 -MELFNGLFFFASDIPQEPAQARLLYRNNWLRIIPDANYTPVPLVPQLR-----PDTQ
 psBphP2 -LPSYGLNFPGSIDIPQAQARLLYRNLWIRLIPDATYVPPVALIPTLR-----PATG
 pssBphP1 -MELFNGLFFFASDIPQEPAQARLLYRNNWLRIIPDADYIPVPLVPQLR-----PDTQ
 pssBphP2 -LPSYGLNFPGSIDIPQAQARLLYRNLWIRVIPDATYVPPVLIPTLR-----PATG
 pstBphP1 -MELFNGLFFFASDIPQEPAQARLLYRNNWLRIIPDANYTPVPLVPQLR-----PDTQ
 rcPpr -WPQSFAGLHFPASDIPRQARELYSQSLSRHVPRDDYVPPVPHRI-----EGT
 rLBphP -IGSFLGLHYPASDIPVQARALYLRNLFRRIADAVDPVPLPPLD-----EHG
 atBphP2 -LESFLGQYFPASDIPQQARALYKNTLRIISDASGTRIPVLPVAVD-----VSG
 brBphP -LEAFLGNRYPASDIPQIARRLYERNVRVLLVDVNYTPVPLQPRIS-----PLNG
 rpBphP1N -LESYFGNRYPSSDIPQMARRLLYERQRVRVLVDVSYQPVPLERLS-----PLTG
 rpBphP2N -VESYGLHFPASDIPQAQARLLYTPVRIIPDINYRPVPTPDLN-----PVTG
 rpBphP3N -IPSLLDFHFPSDIPQAQSRALYTPVRIIPDINGYRPSPLVPDIN-----PRLG
 rpBphP4N -TSPFLGLRDPQPDISNQPGSIS---RIRVQPDVHAPAAPLWAHS-----PRNG
 rpBphP5N -LEPYGLHYPATDIPAPARRLFALSWSVRHLFDVGYTPVPLLAKS-----PLVT
 rpBphP6N -LESFLGQHFPASDIPQQARLLYLNKAIRVISDSRGIISSRIVPERD-----ASG
 rrBphP -VESYKGQRFPASDIPQAQARALYSRNLLRSIPDVHYRPLPVGRS-----PDG
 rsBphP1 -LEPYGLHYPASDIPQIARALYLRQRVGAIADACYRPVPLLGHPE-----LDDG
 rsBphP1a -LEPYGLHYPASDIPQIARALYLRQRVGAIADACYRPVPLLGHPE-----LDDG
 toCphB -LSPYLSLRYPASDIPKQARQLYRDNWRLRLIPDVYQPVALLPHHN-----PVTN
 xaBphP -LEAYGLHYPASDIPQAQARALYLRNRVRQIADEVYQPSP1QPTLH-----PRLG
 xcBphP -LEAYGLHYPASDIPQAQARALYLRNRVRQIADEVYQPSP1QPTVH-----PQLG
 anFPH1 -SIDLFKGLHFPAAIDIPKQARDLYRINKVRLLYDRDHVTARLVCRAL-----EDLE
 bfFPH2 -SDDIFRGLHFPASDIPKQALDLYKINRMLHDRDEKTARLVCRHQ-----SDFE
 chFPH1 -TKDLYKGLNFPASDIPKQARELYKINKVRMLYDRDLQTAARLVCRTA-----EDLE
 cnFPH1 -TTDLYMGLRFPATDIPPPQARELYKINKVRMLYDRSQTARMVLRNK-----EDLD
 gmFPH1 -TRDLYKGLHFPASDIPRQARDLYKLNKNCLPNKRRPRHSARHEPLL-----
 gzFPH1 -TRDLYKGLHFPASDIPRQARDLYKLNKNCLPNKRRPRHSARHEPLL-----
 ncFPH1 -TRDLYKGLHFPATDIPSQARELYKLNKVRLLYDRDVESARIVCRTP-----EDLE
 ncFPH2 -SNDVYRGLHFPASDIPPPQARKLYMINKVRVLFDRSQRTSRLIGRDV-----SDMD
 umFPH1 -SHDLYRGLHFPATDIPQAQARALYKINKVRLLYDRDQPTARMICRDQ-----ADLD
 aphC -RLPSLLGLNFPADDIIPPQARELLVKSJKVRSIVDVATGMIGQSPVHD-----LETG
 cph2 -ALPSLLGLHFPVEDIIPPQAREELGNQRKMIAVDVAHRRKKSHELSG-----RIS
 npCph2a1 -RLPSLLGLNFPADDIPLSARELFLKLRVRSVNVNDTQEIGQIHLRD-----LDNG
 npCph2a2 -RLPPLGLNFPADDIIPPYARELFVRARQRCIVDLTTQEIGISPLDC-----PETG
 npCph2b -RLPSLLGLRFPVHDIEAPEAREMFLLAGQRSIVDVANHKIGLSPLO-----TETG

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arphyA FDLTCGSTLRAPHSCHLQYMANMDSIASLVMAVVNEEDGEADPDS---TTQPQKRKR
 asphya3 FDISLCGSALRAPHSCHLQYMNMMNSIASLVMAVVNENEEDDEAESEQ---PAQQKKKK
 asphya4 FDISLCGSALRAPHSCHLQYMNMMNSIASLVMAVVNENEEDDEAESEQ---PAQQQQKKK
 atphya FDLTCGSTLRAPHSCHLQYMANMDSIASLVMAVVNEEDGEADPDA---TTQPQKRKR
 cpphyA FDLTCGSTLRAPHSCHLQYMNMMNSIASLVMAVVNEGDEENEGP----ALQQQKRKR
 cupphyA FDLTCGSTLRAPHTCHLQYMNMMNSIASLVMIAVVNDGdde-EEEE---RSGSGKRKR
 gmphyA FDLILCGSTLRAPHSCHAQYMANMDSIASLVLAVVNDNEEDGDTD----AVQPQKTER
 lephyA FDLTCGSTLRAPHYCHLQYMNMMNSIASLVMAVVVNDGDEEDESSD---SSQSQKRKR
 lsphyA FDLTCGSTLRAPHSCHLQYMANMDSIASLVMAVVVNDSDEDGDSAD---AVLPQKKKR
 mgphyA IDLTCGSTLRAPHSCHLQYMNMMNSIASLVMSSVNVNEGDEEGGGSSVSSNQQQKIKR
 ntphyA FDLTCGSTLRAPHYCHLQYMNMMSSIASLVMAVVVNDGDEEDESSD---STQSQKRKR
 omphyA FDLTCGSTLRAPHGCHSQYMNMMNSIASLVMSSVNVNEGDEGDPS---SGPYKRKR
 osphyA LDISLCGSTLRAPHSCHLQYMNMMNSIASLVMAVVNENEEDDEVGADQP---AQQQKRKK
 pcpphyA FEITLCGSTLRAPHSCHLQYMNMMNSIASLVMAVVINDSDEVVESSD---RNSVKSKK
 psphyA FDLTCGSTLRAPHSCHLQYMANMDSIASLVMAVVVNDSDEDGDSAD---AVLPQKKKR
 sbphyA IDISLCGSTLRAPHSCHLQYMNMMNSIASLVMAVVVNEEDDEPGPEQP---PQQQKKKR
 slphyA1 VDLTCGSTLRAPHSCHLQYMNMMNSIASLVMAVVVNDDEDDGGSAP---AQPHKRKR
 slphyA3 VDLTCGSTLRAPHSCHLQYMNMMNSIASLVMAVVVNDDEDDGGSAP---AQPHKRKR
 slphyA4 VDLTCGSTLRAPHSCHLQYMNMMNSIASLVMAVVVNDGDEEDESSD---SSQSQKRKR
 stphyA FDLTCGSTLRAPHYCHLQYMNMMNSIASLVMAVVVNDGDEEDESSD---SSQSQKRKR
 taphya FDISLCGSALRAAHSCHLQYMNMMNSIASLVMAVVNENEEDDEVGSEQP---AQQQKKKI
 zmpphyA1 IDISLCGSTLRAPHSCHLQYMNMMNSIASLVMAVVNENEEDDEPESEQP---PQQQKRKK
 atphyb QSMCLVGSTLRAPHGCHSQYMANMGSIASLAMAVIINGNEEDDGSN---VASGRSSMR
 atphyd QFICLVGSTLRAPHGCHAQYMTNGMSIASLAMAVIINGNEEDNGNV---NTGRNSMR
 gmpyb QPLCLVGSTLGAPHGCHAQYMANMGSIASLVMAVIINGNEEDEG---VGGRSSMR
 lephb1 QPLCLVGSTLRAPHGCHAQYMANMGSIASLTLAVIINGNDEEAV-----GGGRNSMR
 lephb2 QPLCLVGSTLRAPHGCHPQYVMNMGVASLTLAVVINGNDDEV-----GGRNAMR
 npphyB QPLCLVGSTLRAPHGCHAQYMANMGSIASLTLAVIINGNDEEAV-----GGRSSMR
 ntphyb QPLCLVGSTLRAPHGCHAQYMANMGSIASLTLAVIINGNDEEAV-----GGRSSMR
 osphyb QPLCLVGSTLRSPHGCQYMANMGSIASLVMAVIISSGGDDHN-IA---RGSISSAMK
 pbphyb1 QPLCLVGSTLRAPHGCHAQYMANMGSIASLAMAVIINGNEEEAI-----GGRNSTR
 pbphyb2 QPLCLVGSTLRAPHGCHAQYMNENMGSIASLAMAVIYGNDEEAI-----GGRNSMR
 sbphyB QPLCLVGSTLRAPHGCHAQYMANMGSIASLVMAVIISGGDDEQTG---RGGISSAMK
 slphyb QPLCLVGSTLRAPHGCHSQYMANMGSIASLVMAVIINGNDDEG-----STRNAMR
 stphyb1 QPLCLVGSTLRAPHGCHAQYMANMGSIASLTLAVIINGNDEEAV-----GGGRNSMR
 stphyb2 QPLCLVGSTLRAPHGCHAQYMANMGSIASLTLAVIINGNDEEAV-----GGGRNSMR
 zmpphyb1 QPLCLVGSTLRAPHGCHAQYMANMGSIASLVMAVIISGGDDEQTG---RGGISSAMK
 zmpphyb2 QQLCLVGSTLRAPHGCHAQYMANMGSIASLVMAVIISGGDDERTG---RGAISSSMK
 atphyC QPIISLGSTLRAPHGCHAQYMSNMGSVASLVMVTINGSDSDEMN-----RDLQTGRH
 osphyC QPIISICGSTLRAPHGCHAQYMASMGSVASLVMVTINGSDSDEMN-----QPKGRK
 sbphyC QPLSLCGSTLRASHGCHAQYMANMGSVASLVMVTINGSDSDEMN-----QPKGRK
 slphyC QPLSLGGSTLRAPHGCHAQYMANMGSIASLVMVTINGSDSDEMN-----RHRTRK
 taphyc QPIISLCGSTMRAHPGCHAQYMANMGSIASLVMVTINGSDSDEMN-----QPKGRK
 zmpphyC1 QPLSLCGSTLRASHGCHAQYMANMGSVASLAMVTINGSDSDEMN-----QPKGRK
 zmpphyC2 QPVSLCGSTLRASHGCHAQYMANMGSVASLVMVTINGSDSDEMN-----QPKGRK
 lephye QPICLVNSTLRSRPHSCHESKYMANMGSISSLVMAILINSGD-----SMK
 atphye RPLCLVNSTLRAPHGCHTQYMANMGSVASLALAIIVVKGKD-----SSK
 inphye QPLCLVNSTLRSRPHGCHTKYMANMGSIASLVMVAVINSSE-----SMK
 lephyf QSLSLGGSTLRAPHGCHAQYMTNGVVASMAMSVMINEQDDELSD-----QVGRK
 acvphy1 QPMSLTGSTLRAPHGCHTQYMANMNSISSLKVAKIVNDSDDSA-----GHSSQGIK
 acvphy2 QPLSLAGSTLRAPHGCHSQYMANMGSIASLVMAVVVNDNDEDVSN-----RSQQPKMRR
 acvphy3 QPIISLAGSTLRAPHGCHAQYMSNMGSASLTMAVIAIDDYDDDSS-----LSCGSRK
 apphy1 QPLSLAGSTLRAPHDCHSQYMANMGTIASLVMAVIVNDNDEEVSN-----RTHQPKQRK
 cpphy2 QPVSLAGSTLRAPHGCHAQYMGNMGSIASLVMAVIINDNEEDS-----RGAIQRGRK
 mcpphy1 HPIISLAGSTLRGVHGCHAQYMANMGSVASLVMAVIINDNSSEEATAAG---GILHKGRK
 mpphy1 QPLSLAGSTLRAPHGCHAQYMGNMGSIASLVMAVIINVNDEEYSS-----RGYHHKGRK
 msphy1 QEMSLAGSTMRCVHGCHTQYMMNMGSSTASLVMVTINGDNEIAG-----GPGMKGRK
 papphy1 QPLSLCGSTLRAPHGCHAQYMANMGSIASLVMVTTNENGDDSEGGQ---QQPQNRK
 ppphy0 QPVSLAGSTLRSPHGCQYMGNMGSIASLVMAVIINDNEEDS-----HGSVQRGRK
 ppphy1 QPVSLAGSTLRSPHGCQYMGNMGSIASLVMAVIINDNEEDS-----HGSVQRGRK
 ppphy2 QPIISLAGSTLRAPHGCHAQYMGNMNSIASLVMAVIVNDPDEDPN-----ARGGQQRGRK
 ppphy3 QPVSLAGSTLRSPHGCQYMGNMGSISISSIVMAVINDNEEDS-----RGSVQRGRK
 ppphy4 QPIISLAGSTLRAPHGCHAQYMGNMNSIASLVMAVIVNDPDEDPN-----RGGQQRGRK
 psphy1 QPLCLVGSTPSAPHGCQYMANMGSISSLLMAVINGNDDEGG-----GSGRNNSMK
 smphy1 QPIISLAGSTLRAPHGCHAQYMGNMGSVASLVMVAMINDNDEPSGGGG---GGQHKGRR
 aphA RPVDLTSILRSAANCHLEYLHNMGVGASLTISLIKD-----NK
 cph1 RAVDLTESILRSAANCHLEYLHNMGVGASLTISLIKD-----GH
 cwCph1 TALDLTHSILRSAASPCHLEYLHNMGVGASLTISLIKD-----RK
 npCph1 RPINLTNSILRSAASCHTEYLHNMGVGASLTISLIKD-----QK
 cwCph1a KKLDLQNAFLRSIAPCHIEYLHNMGVTASFNISLLKE-----NK
 npCph1a QHLDLSYCLLRSFDWCCAELYHNMGVKALLVLSIQE-----QK
 toCphA QPIDLTNSILRTAANCHLEYLHNMGVGASLTISLIKD-----GK

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aphB	QPLDLRSVLRSVSPLHIEYMQNMGVTA MSMISIMKN-----	QK
atBphP1	AVLDMSFSQLRSVSPVHLEYMRNMGTA ASMSVSIVVN-----	GA
atBphP3	AVLDMSFSQLRSVSPVHLEYMRNMGTA ASMSVSIVVN-----	GA
avAphB	QPLDLRSVLRSVSPLHIEYMQNMGVTA MSMISIMKN-----	QK
chBphP1	QNLDLSCSVLRSPSPIHVQYLHNIGVGAT LTLSIHK-----	KK
chBphP2	GFVDLGVCNLRGVIKVHLEYLT NMNVKSSMSTRILKD-----	NT
drBphP	APTPLGGAVL RATSPMHM QYLRNMGVGSSLSV VVG-----	GQ
goBphP	AGLDLSDVQLRSVSPVHLEY MANGMTRASASLV VVD-----	GV
krBphP	APLDLHSVLRSPV SPIHV EYLKNMGVGASMS ISLIVE-----	GR
mmBphP2	GAPDQTFGDLRSVSP PMHLYLGNMGVR ASFASILMR-----	GK
paBphP	ESFDLSYSVLRSPV SPIHC EYLTNMGVR ASMSISIVVG-----	GK
pfBphP	TPLDLSFATLRSVSP PIHCQY MKNMGV LSSMSISLLKG-----	DK
ppBphP1	EPLDLSYAHRLS VSPV HCEYLC NMGV GASMSISIV VN-----	GE
ppBphP2	KPLDMSFAALRSV SPVHLQY MRNMGTL ASMSL SIVVD-----	GQ
pkBphP2	KPLDMSFAALRSV SPVHLQY MRNMGTL ASMSL SIVVD-----	GQ
psBphP1	QQLDLSFSTLRSV SPVH CQY MKNMGV LSSMSV LIQG-----	GK
psBphP2	QQLDLSFSTLRSV SPVH CQY MKNMGV LSSMSV LIQG-----	GE
pssBphP1	QQLDLSFSTLRSV SPVH CQY MKNMGV LSSMSV LIQG-----	GK
pssBphP2	QQLDLSFSTLRSV SPVH CQY MKNMGV LSSMSV LIQG-----	GE
pstBphP1	QQLDLSFSTLRSV SPVH CQY MKNMGV LSSMSV LIQG-----	GK
rcPpr	EPLDLSFSRHS LSPV HQLQY RNMGV TASMS FSILVE-----	GR
r1BphP	QPLDLSMSV LRSPV SPIH IEYLN MGVG ASMS SIVVD-----	GK
atBphP2	EPLDLSYAHRL SVPV HCEY LNMG VGAS MSISIV VD-----	GA
brBphP	RDLDSMSL SCLRS MSPIH QKYLN MGVG ATL CSLM V-----	GR
rpBphP1N	RDLDSMSG CFLRS MSPIH QYLQ LNMG VRATL VSVL VVG-----	GK
rpBphP2N	RPIDL SFAIL RSV SPV HLE YMRN IGMH GTM SISI LRG-----	ER
rpBphP3N	GPIDL SFSV LRSP VSP THLEY VMNM GMHA AMMS SIV RD-----	NR
rpBphP4N	LALDL SFTA TRS ASPE HRLY AQLG VAAS LSSL V V-----	GE
rpBphP5N	GPVDM SFASL RSV SVMY TG LNMG VQ STL V ML VKE-----	GR
rpBphP6N	AALDL SFAH RLRS VSP PIH LEY RNMG VSAS MSL SII RG-----	GT
rrBphP	RELD MTFC CNL RSV SPV HLEY LRN MGVA ASF SV LV V-----	GR
rsBphP1	KPLDL THSS LRSP VSP VLDY MQN MNTA ASLT I GLADG-----	DR
rsBphP1a	KPLDL THSS LRSP VSP VLDY MQN MNTA ASLT I GLADG-----	DR
toCphB	QPTDL SHS VLR VSP HIEY LN MGV KA MSMS SISI LLKN-----	QK
xaBphP	TPV DL SDV SLRS VSP PVH LEY LAN MGV SAT LV SS IV VN-----	DA
xcBphP	TPV DL SDV SLRS VSP PVH LEY LAN MGV TAT LV AS IV VN-----	DA
anFPH1	TPLDM THAYL RAM SPI HI KY LAN MG VA AS MS SIS IN SM-----	ND
bffPH2	KPLDL THAYL RAM SPL HL KY LS NM MG VR ST MS SIS IN V-----	GD
chFPH1	VPLDL THSYL RAM SPI HL KY LA MA VR SS MS SIS IN AF-----	GE
cnFPH1	QPLDM THCYL RAM SPI HL KY LG NM MS VR SS MS SIS IM AF-----	GQ
gmFPH1	VPLDM HSY L RAM SPI HI KY LN MA VR SS MS SIS IN AF-----	NE
gzFPH1	----- SASH VAYS YH LK LN MA VR SS MS SIS IN AF-----	NE
ncFPH1	TPLDM THSYL RAM SPI HL KY LN MA VR SS MS SIS IN AF-----	GD
ncFPH2	VPLDL THAYL RAM SPV HL KY LN MG VR SS MS LES D-----	GK
umFPH1	FPV DM THA FIR AM SPI HI KY LT N MG V R SS MS V IT AF-----	GE
aphC	ELIS -EDIC YRP VDS CH I QY LL AM GV V K S V V A P I LY Q-----	DE
cph2	PTEH -SNG HYTT VDS CH I QY LL AM GV V K S V V A P I LY Q-----	QQ
npCph2a1	ETIS -EE IYR YR V D S C H I E Y L T A M G V K S V V P I V L K N Q E T G D S P N V M-----	DQ
npCph2a2	KPLEQQD IYR YR V D P C H I E Y L T A M G V K S V V P I V L K N Q E T G D S P N V M-----	ESSQ
npCph2b	KHLQ -TNI YYR K V D P C H I E Y L T A M G V Q S S L V V P I L D S P Q Q-----	AKPK
arphyA	LWGLV -VCH NTTPR --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
asphyA3	LWG LL -VCH HES PR --Y VP FPL RYACE FLA QV FA HV N REF E L K Q L R E K N I L R T Q -T L L	
asphyA4	LWG LL -VCH HES PR --Y VP FPL RYACE FLA QV FA HV N REF E L K Q L R E K N I L R T Q -T L L	
atphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
cphyA	LWG LV -VCH NSPR --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
cupphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
gmphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
lephyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
lsphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
mgphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
ntphyA	LWG LV -VCH NTTP --F VP FPL RYACE FLA QV FA HV N KE V E L E N Q I V E K N I L R T Q -T L L	
omphyA	LWG LV -VCH NTCP --F IP FPL RYACE FLV QV FSI H V N KE E L N Q M L E K N I L R T Q -T L L	
osphyA	LWG LV -VCH ESPR --Y VP FPL RYACE FLA QV FA HV N KE F E L R Q V R E K S I L R M Q -T L L	
pcphyA	LWG LV -VCH NTSP --F VP FPL RYACE FLA QV FA HV N KE E L N Q I V E K N I L R T Q -T L L	
psphyA	LWG LV -VCH NTPR --F VP FPL RYACE FLA QV FA HV N KE E L E N Q I V E K N I L R T Q -T L L	
sbphyA	LWG LV -VCH NTPR --F VP FPL RYACE FLA QV FA HV N KE E L E N Q I V E K N I L R T Q -T L L	
slphyA1	LWG LV -VCH HTSPR --F VP FPL RYACE FLA QV FA HV N KE E L E N Q F L E K K I L R T Q -T L L	
slphyA3	LWG LV -VCH HTSPR --F VP FPL RYACE FLA QV FA HV N KE E L E N Q F L E K K I L R T Q -T L L	
slphyA4	LWG LV -VCH HTSPR --F VP FPL RYACE FLA QV FA HV N KE E L E N Q F L E K K I L R T Q -T L L	
stphyA	LWG LV -VSH NTPR --F AP FPL RYACE FLA QV FA I L V N K E E L E N Q F L E K K I L R T Q -T L L	

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taphya	LWGLI-VCHHESPR--YVPFPLRYACEFLAQVFAHVNVKEFEVQKQLREKSILRMQ-TIL
zmphya1	LWGLI-VCHHESPR--YVPFPLRYACEFLAQVFAHVNVKEFELEKQIREKSILRMQ-TML
atphyb	LWGLV-VCHHTSSR--CIPFPLRYACEFLMQAFGLQLNMELQLALQMSEKRLVRTQ-TLL
atphyd	LWGLV-VCHHTSAR--CIPFPLRYACEFFMQAFGLQLNMELQLALQVSEKRLVRTQ-TLL
gmphyb	LWGLV-VCHHTSAR--CIPFPLRYACEFLMQAFGLQLNMELQLAAQSLEKRLVRTQ-TLL
lephb1	LWGLV-VGHHTSVR--SIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
lephb2	LWGLV-VGHHSAR--FIPFPLRYACEFLMQAFGLQLNMELQLASQLAEKRLVRTQ-TVL
npphyB	LWGLV-VGHHTSAR--CIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
ntphyb	LWGLV-VGHHTSAR--CIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
osphyb	LWGLV-VCHHTSPR--CIPFPLRYACEFLMQAFGLQLNMELQLAHQLSEKHILRTG-TLL
pphyb1	LWGLV-VCHHTSAR--CIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
pphyb2	LWGLV-VCHHTSAR--CIPFPLRYACEFLMQAFGLQLNMELQLASQLLEKHVLRTQ-TLL
sbphyB	LWGLV-VCHHTSPR--CIPFPLRYACEFLMQAFGLQLNMELQLAHQLSEKHILRTQ-TLL
slphyb	LWGLV-VCHHTSPR--SIPFPLRYACEFLMQAFGLQLNMELQLSAQVLEKRLVRTQ-TLL
stphyb1	LWGLV-VGHHTSVR--SIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
stphyb2	LWGLV-VGHHTSAR--SIPFPLRYACEFLMQAFGLQLNMELQLASQLSEKHVLRTQ-TLL
zmpphyb1	LWGLV-VCHHTSPR--CIPFPLRYACEFLMQAFGLQLNMELQLAHQLSEKHILRTQ-TLL
zmpphyb2	LWGLV-VCHHTSPR--CIPFPLRYACEFLMQAFGLQLNMELQLAHQLSEKHILRTQ-TLL
atphyc	LWGLV-VCHHASPR--FVPFPLRYACEFLTVQFGVQINKEAESAVLKEKRILQTQ-SVL
osphyc	LWGLM-VCHHTSPR--FVPFPLRYACEFLLQVFGIQINKEVELAAQAKERHILRTQ-TLL
sbphyc	LWGLV-VCHHTSPR--FVPFPLRYACEFLLQVFGIQLNKEVELAAQAKERHILRTQ-TLL
slphyc	LWGLV-VCHHTSSR--FVPVPLRYACEFLVQVFGIHINKEVELAAQVREKHILKIQ-SML
taphyc	LWGLV-VCHHTSPR--FVPFPLRYACEFLLQVFGIQLNKEVELASQAKERHILRTQ-TLL
zmpphy1	LWGLV-VCHHTSPR--FVPFPLRYACEFLLQVFGIQLNKEVELAAQAKERHILRTQ-TLL
zmpphy2	LWGLV-VCHHTSPR--FVPFPLRYACEFLLQVFGIQLSKEVELAAQAKERHILRTQ-TLL
lephye	LWGLI-VCHHTSPR--YVPFPLRYACEFFTQAFGLQLNMELQLASQLAEKKTLQMQ-TLL
atphye	LWGLV-VGHHCSPR--YVPFPLRYACEFLMQAFGLQLQMELQLASQLAEKKAMRTQ-TLL
inphye	LWGLV-VCHHTSPR--YVPFPLRYACEFLMQAFSLQLYMEQLASQLAEKKIQTQ-TLL
lephyf	LWGLV-VCHHTCPR--FLSFPLRYASEFLLQVFSQVNKEVEMAQLKEKQILQIQ-TVL
acphy1	LWGLV-VCHHTSPR--YVPFPVRSAUCEFLMQVFSQLNMEVMAQVREKRILRTQ-TLL
acphy2	LWGLV-VCHHTTPR--AVPFALRSAUCEFLMQVFGQLQNMELELAQMREKHILRTQ-TLL
acphy3	LWGLV-VCHHPSPR--TVSYPLRCACEKLMVAFGVQLNIELDLAQLRENHILTTQ-ALL
appy1	LWGLV-VCHHTTPR--AVPFPLRSACEFLMQVFGQLQNMEVELAAQLREKHILRTQ-TLL
cphy2	LWGLV-VCHHTSPR--TVPFPLRSACEFLMQVFGMQLNMEVELAAQLREKHILRTQ-TLL
mphy1	LWGLV-VCHHSSPR--YVPFPLRSACEFLMQVFGQLQNMEVELSSQLREKHILRTQ-TLL
mphy1	LWGLV-VCHHTTPR--SVPFPLRSACEFLMQVFGQLQNMEVELAAQLREKRILRTQ-TLL
msphy1	LWGLI-VCHHSTPR--HIPFPIRSACEFLMQVFGQLQNMEVELAAQHREKHILRTQ-TLL
paphy1	LWGLV-VCHHTSPR--VIPFPLRYACEFLMQVFGIQLNKEVELAAQLREKHILRVQ-PVL
pphy0	LWGLV-VCHHTSPR--TVPFPLRSACGFLMQVFGQLQNMEVESAAQLREKHILRTQ-TLL
pphy1	LWGLV-VCHHTSPR--TVPFPLRSACGFLMQVFGQLQNMEVELAAQLREKHILRTQ-TLL
pphy2	LWGLV-VCHHTSPR--TVPFPLRSACFLLQVFGQLQNMEVELAAQLREKHILRTQ-TLL
pphy3	QWGLV-VCHHTSPR--TVPFPLRSACFLLQVFGQLQNMEVELAAQLREKHILRTQ-TLL
pphy4	LWGLV-VCHHTSPR--TVPFPLRSACFLLQVFGQLQNMEVELAAQLREKHILRTQ-TLL
psphy1	LWGLV-VCHHTSPR--AVPFPPLRYACEFLMQALGLQLNMELQLAAQLTEKHILRTQ-TLL
smphy1	LWGLV-VCHHTSPR--SVPF-LRSACEFLMQVFGQLQNMEAAVAHVREKHILRTQ-TLL
aphA	LWGLI-ACHHLSAK--YVSYELRKACEFLGRVIFAEISAREE-TEDYDYRMNLTHI-QSL
cph1	LWGLI-ACHHQTPK--VIPFELRKACEFFGRVVFNSINAQED-TETFDYRVQLAEH-EAV
cwCph1	LWGLI-ACHHLPK--YVPYELRKACEFLGQVVFSEISAKEE-TKDYDYRMKLTRI-QGA
npCph1	LWGLI-ACHHQSPK--YVSYELRKACEFLGRVIFAEISAREE-TEDYYHRINLTHL-QSI
cwCph1a	LWGLI-ACHHYSPK--YVIYEIRKICELLGEIFSLLKLYEEE-KSFRQYRQTIKEI-KKR
npCph1a	LWGLI-SCHHQTPK--YISYEVRMKCEFLGQIVSSELAHKIS-SSEWDYKVKLKSL-QSE
toCphA	LWGLI-ACHHQTPK--YVSYEFRKACEFLGRVIFTEISTREE-TEDYDYRMNLAYI-QTV
aphB	LWGLI-ACHHQSPK--YIPYEIRSACEFLGQMTSVEMSAKED-SEDTEDKIQVKSV-HSK
atBphP1	LWGLI-ACHHATPH--SVSLAVREACDFAAQLLSMRIAMEQS-SQDASRRVELGHI-QAR
atBphP3	LWGLI-ACHHATPH--SVSLAVREACDFAAQLLSMRIAMEQS-SQDASRRVELGHI-QAR
avAphB	LWGLI-ACHHQSPK--YIPYEIRSACEFLGQMTSVEMSAKED-SEDTEDKIRVKSV-HSK
chBphP1	LWGLV-ACHHYSPK--YLHYETKLAALKQGHFTSQIEIREQ-NEQYATSQKLHQAVDDL
chBphP2	LWGLI-ACHHREKK--FLNFDCQCSVEMFSNVVSTRLSALET-EQNLTKTTENQALMNSI
drBphP	LWGLI-ACHHQTPT--VLPPDLRTTLEYLGRLLSLQVQVKEA-ADVAFRQSLREH-HAR
goBphP	LWGLI-ACHNATPR--CLSEDIRAACRTLAGVMSRQLRNKEE-LVTYQERLRLRNA-MEF
krBphP	LWGLV-ACHHYSGA-HRPGYDAQSAEFLSQTAQSQLIGERARSQERDGALAAQELL-SDI
mmBphP2	LWGLI-ACHHPEPK--PLSLDVRQLVKIARDFSVGLVYIA-SIHLKFIDGIQRE-VRT
paBphP	LWGLF-SCHHMSPK--LIPYPVVRMSFQIFSQVCSAIVERLEQ-GRIAELLRVSTER-RLA
pfBphP	LWGLI-SCGNRQPL--HVPHELRTACQTIGQVLSLQISAMEA-LEVSRQREEKLEA-LAL
ppBphP1	LWGMi-ACHHYAPR--TLAMGORVAAEMFEGFFSLHIETLRS-RQKLEAAVRIHKA-LDS
ppBphP2	LWGLI-SCHHQQPR--PVDLRTRTACELLASVLSLQIESRES-HASTRKLTLRQH-IVR
ppkBphP2	LWGLI-SCHHQQPR--PVDLRTRTACELLASVLSLQIESRES-HASTRKLTLRQH-IVR
psBphP1	LWGLI-SCGHRTP--YVSHELRSACQAIGQVLSLQISAMEA-LEVSRQRETQIQT-LQQ
psBphP2	LWGLI-TCSHPEPL--LVSRELRDACAMIGQLLSVKISAIVA-THIQREREKVV-LGQ
pssBphP1	LWGLI-SCGNRTP--YVSHELRSACQAIGQVLSLQISAMEA-LEISRQREAKVRA-LEQ
pssBphP2	LWGLV-ACGHPEPL--RVSRELRDACAMIGQLLSVKISAIVA-TNIQREREKVV-LGQ
pstBphP1	LWGLI-SCGHRTP--YVSHELRSACQAIGQVLSLQISAMEA-LEVSRQRETQIQT-LQQ

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rcPpr	LWGMV-AHHRQPH--HVAIPRSSAAMTVVEAVALSIAAVER-AEAMGRQVDHAV-LTA
r1BphP	LWGLF-ACHHYGPR--LPSAQSRSTAELFGQMFAESRER-RLALDYETKARRI-ADR
atBphP2	LWGLI-ACHHYSPR--VLSMPVRIAAEFMGEFFSMHLQVLKQ-KRRLDTINHAHAA-LDR
brBphP	LWGLI-ACHHYEPR--FVPFDIRAAGEALAECAIRIAALES-FAQSQSELVVRRL-EQR
rpBphP1N	LWGLV-ACHHYLPR--FIHFELRAICELLAEAIAITRAALES-FAQSQSELVQRL-EQR
rpBphP2N	LWGLI-ACHHRKPN--YVLDGRQACELVAQVLAWQIGVMEE-QAITRQLKGQAI-QRS
rpBphP3N	LWGMI-SCHNLTPR--FVSYEVRQACELIAQVLTWQIGVLEE-AEIVRHNSVRMRAI-QNR
rpBphP4N	LWGLI-VCHHATPR--FLPYRMREACALFAEMASLQLETRLA-ADQLAARLRSTRI-HEE
rpBphP5N	LWGLISAMHAAPR--HISHQMRMAAEFLAHTLSLLMSAKED-AEQFERSSARKAA-AEA
rpBphP6N	LWGLI-ACHHYEPR--AVPMAQRVAEEMFADFFSLHFTAAHH-QRRFQSSLRTRT-LDS
rrBphP	LWGLV-ACHDRVPR--RLSLATMGACQVYAEITIAQQVRLDN-TRRSRHRSRTGDL-IDD
rsBphP1	LWGML-VCHNTTPR--IAGPEWRAAGMIGQVVSVSLLSRLGE-VENAAETLARQST-LST
rsBphP1a	LWGML-VCHNTTPR--IAGPEWRAAGMIGQVVSVSLLSRLGE-VENAAETLARQST-LST
toCphB	LWGLI-ACHHESPK--YVPEIERSACEFLGQMTSLELAAKED-SENTEYKMQLKAV-QSK
xaBphP	LWGLI-SCHHYSPPH--FTSHAMDRTDAVTRALAGRIGALQA-VGRARLESVLLTI-REK
xcBphP	LWGLI-SCHHYSPPH--FTNHAMDRTDAVARTLAGRIGALQA-VARARLESVLLTV-REK
anFPH1	LWGLI-SCHSYGPRGMRVSFPPIRKMCRLIGDTSRNIERLSY-ASRLQARKLINTV-P--
bFPH2	LWGLI-ACHGYGSHGTRVTLPRELARNIGECASTNIERLLM-RQRIEARAPRN-P--
chFPH1	LWGLI-ACHTYGPRGMRVSFPPIRKMCRLIGDTSRNIERLSY-ASRLQARKLINTV-P--
cnFPH1	LWGLI-ACHSYGQHGMRVSFPIRQMLRLSDSISRNIERLSY-AQRLHTRKLISTI-P--
gmFPH1	LWGLI-SCHSYGNHGMRVSFPIRKMCRLVGDTASRNIERLSY-ASRLQARKLINTA-P--
gzFPH1	LWGLI-SCHSYGNHGMRVSFPIRKMCRLVGDTASRNIERLSY-ASRLQARKLINTA-PT-
ncFPH1	LWGLV-SCHSYGPKGMRVSFPPIRKMCRLIGDTSRNIERLSY-ASRLQARKLINTV-P--
ncFPH2	LWGLI-VCHSYGPAATRVPEFSIRELSFFVGLAATCLQKLNN-SERLQAHRIIETL-R--
umFPH1	LWGLI-SLHNHYGAHKRVSFPPIRQLRLIGEVSSNIERLSY-TRRLSARKLINTL-P--
aphC	LWGLL-VSHHSENRR--TVSEDELEAMQMIVDQLAVIAQSHLLTQARKKAQKEAII-NRI
cph2	LWGIM-AVHHSKPR--RFTEQEWTMALLSKEVSLAITQSQLSRQVHQQQVQEALV-QRL
npCph2a1	LWGLL-VSHNSEAR--LISEYELEAVQMVVEQLSVAIAQSSLLTQVRKTAERETII-NRI
npCph2a2	LWGLL-VSHHSQAR--VVTQQUELLIQSVDQVAIAISQSILLTQVREQARQEAI-NKV
npCph2b	LWGLL-VSHQSKPR--KILKREIKVLLQQVADQVAIAIAQSNLLTAALTQQKQEATI-NRV

aphyA	CDMLMRD-----APLGIVSQS-----
asphyA3	SDMLFRE-----ASPLTIVSGT-----
asphyA4	SDMLFRE-----ASPLTIVSGA-----
atphyA	CDMLMRD-----APLGIVSQS-----
cphyA	CDMLMRD-----APLGIVSRS-----
cupphyA	CDILLRD-----AVLGIVSQSQS-----
gmphyA	LCMLMRD-----APLGIASES-----
lephyA	CDMLMRD-----APLGIVSQS-----
lspphyA	CDMLMRD-----APLGIVSQS-----
mgphyA	CDMLMRD-----APLGIVSQS-----
ntphyA	CDMLMRV-----APLGIVSQS-----
omphyA	CDLLLKD-----VPLGIVSQS-----
osphyA	SDMLLRE-----SSPLSIVSGT-----
pcphyA	CDLLMRD-----APLGIVSQS-----
psphyA	CDMLMRD-----APLGIVSQS-----
sbphyA	SDMLFKE-----ASPLSIVSGS-----
slphyA1	CDMLIRD-----APLGIVTHS-----
slphyA3	CDMLMRD-----APLGIVTQN-----
slphyA4	CDMLMRD-----APLGIVTQN-----
stphyA	CDMLMRD-----APLGIVSQS-----
taphyA	SDMLFKE-----ASPLTIVSGA-----
zmphyA1	SDMLFKE-----SSPLSIVSGS-----
atphyb	CDMLLRD-----SPAGIVTQS-----
atphyd	CDMLLRD-----SPAGIVTQR-----
gmphyb	CDMLLRD-----SPTGIVTQS-----
lephb1	CDMLLRD-----SPPGIVTQS-----
lephb2	CDMLLRD-----SPTGIVTQN-----
nphyB	CDMLLRD-----SPTGIVTQS-----
ntphyb	CDMLLRD-----SPTGIVIQS-----
osphyb	CDMLLRD-----SPTGIVTQS-----
pbphyb1	CDMLLRD-----SPTGIVTQS-----
pbphyb2	CDMLLRD-----SPTGIVTQS-----
sbphyb	CDMLLRD-----SPTGIVTQS-----
slphyb	CDMILRE-----SPTGIVTQS-----
stphyb1	CDMLLRD-----SPPGIVTQS-----
stphyb2	CDMLLRD-----SPPGIVTQS-----
zmphyb1	CDMLLRD-----SPTGIVTQS-----
zmphyb2	CDMLLRD-----SPAGIITQS-----
atphyc	CDMLFRN-----APIGIVTQS-----
osphyC	CDMLLRD-----APVGIFTQS-----

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sbphyC	WDMILLRD-----	APVGIFTQS-----
slphyC	CDMLMRD-----	SPITIITQS-----
taphyc	CDMLLRD-----	APVGIFTQS-----
zmpphy1	CDMLLRD-----	APVGIFTTRS-----
zmpphy2	CDMLLRD-----	ALVGIFTQS-----
lephyE	CDMLLRD-----	VPGVVTQS-----
atphyE	CDMLLRD-----	TVSAIVTQS-----
inphyE	CDMLLRD-----	APFGIVTQT-----
lephyF	CDMLLRD-----	APMGIVTQS-----
acphy1	CDMLLRD-----	APIGIVSQS-----
acphy2	CDMLLRD-----	APIGIVSES-----
acphy3	CDMLRRI-----	RGAPIGIVSRS-----
appy1	CDMLLRD-----	APIGIVSES-----
cpphy2	CDMLLRD-----	APIGIVSQT-----
mphy1	CDMLLRD-----	APMGIVSQS-----
mphy1	CDMLLRD-----	APIGIVSQS-----
msphy1	CDMLLRD-----	APMGIVSQS-----
paphy1	CDMLLRD-----	APVGIVSQT-----
pphy0	CDMLLRD-----	APIGIVSQI-----
pphy1	CDMLLRD-----	APIGIVSQI-----
pphy2	CDMLLRD-----	APIGIVSQS-----
pphy3	CDMLLRD-----	APTGIVSQV-----
pphy4	CDMLLRD-----	APIGIVSQS-----
psphy1	CDMLLRD-----	APMGIVTQS-----
smphy1	CDMLLRD-----	APIGIVSQS-----
aphA	LVEYMSQ-----	EDNFVDGLIKHQ-----
cph1	LLDKMTT-----	AADFVEGLTNHP-----
cwCph1	LIESMSQ-----	ADNFIEGLINSN-----
npCph1	LIEYMSQ-----	EENFIDGLVKNP-----
cwCph1a	IKEELSK-----	NKNKHDIFDNIIQKNG-----
npCph1a	FLESISQ-----	ADNFIDALIKPE-----
toCphA	LVEYMSQE-----	ENFIDGLVKHQ-----
aphB	LVQYMSA-----	ENDFINALIDHQ-----
atBphP1	LLKGMAA-----	AEKWVDGLLGGE-----
atBphP3	LLKGMAA-----	AEKWVDGLLGGE-----
avAphB	LVQYMSA-----	ENDFINALIDHQ-----
chBphP1	ISRKFS-----	DRNSLKDIDIV-----
chBphP2	IEELYSQ-----	TMLINAIDNCA-----
drbphP	VALAAA-----	SLSPHDTLSDPA-----
goBphP	VTSHFEVR-----	HPIESNLRSFM-----
krBphP	TAAVSAS-----	GREPLTTLIEE-----
mmBphP2	MLDSAG-----	HLDLTQGLVRCQ-----
paBphP	LARRARD-----	ADDLFGALAHPD-----
pfBphP	LNQAMIDS-----	PQNVFDGLANQP-----
ppBphP1	LLRDANQ-----	AADIDGFFHARL-----
ppBphP2	MISSMAD-----	HDSVSDGLRDLP-----
ppkBphP2	MISSMAD-----	HDSVSDGLRDLP-----
psBphP1	LHQMMATS-----	DTDVFDFGLAQQP-----
psBphP2	LADAMNRA-----	DHEILHGGLVSRP-----
pssBphP1	LNLAMAGS-----	EENVFDGLAQQP-----
pssBphP2	LADAMSRA-----	NHEVLDGLVSRP-----
pstBphP1	LHQMMATS-----	DTDVFDFGLAQQP-----
rcPpr	LMVQMAS-----	SDAVEPALTTQA-----
rlBphP	LLTSVADN-----	ASLLDDPAWLI-----
atBphP2	FLRLAAH-----	HANIEELLVDSF-----
brBphP	LVEAVSRD-----	GEWQAALFDGS-----
rpBphP1N	MIEAITRE-----	GDWRAAIFDTS-----
rpBphP2N	LINDIEQL-----	HDHRAGLARNS-----
rpBphP3N	LLHELGDE-----	QGLTAGLRSVS-----
rpBphP4N	LVTRMSQE-----	SDLAEGLIRFY-----
rpBphP5N	LTRLLDSE-----	ADIGAALHAAGAL-----
rpBphP6N	LTSEMSF-----	DASVDDFLRGNL-----
rrBphP	ISVLLGSG-----	RSLAEALDYTL-----
rsBphP1	LVERLSTG-----	DTLAAAFVAAD-----
rsBphP1a	LVERLSTG-----	DTLAAAFVAAD-----
toCphB	LVEYMAAA-----	NNFVDGLIGQE-----
xaBphP	LITDFNDA-----	EHTVDMMLADMA-----
xcBphP	LITDFNDA-----	EHMTVELLDDMA-----
anFP1	-----	TDANPSGYIVASS-----
bfFP1	-----	GKTPSGFIAASS-----
chFP1	-----	TQHNPSGYIIASS-----
cnFP1	-----	DRSHPTGYIISNA-----

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gmFPH1	-----TDKNPSGYIASS-----
gzFPH1	-----DKNPSGYIASS-----
ncFPH1	-----TDKNPSGYIASS-----
ncFPH2	-----GRGRPDECITSSS-----
umFPH1	-----TDQNPSPGYIISNA-----
aphC	ITLLHSL---PTIVLKPALAAVGAFAGVGGRLCLRN---QAVESQHVVLRS-----
cph2	ETTVAQYGD--RPETWQYALETVGQAVEADGAVLYIAP---DLTGSVAQHYQWNLRF--
npCph2a1	ATLLHSL---PTIVLQPALAAIAAFNGVGGRLCIRN---EAFDYYNGNLTS-----
npCph2a2	TEQLHST---PVAQLQTAALEETVAAFNGSGGRLYLLP--DDEQTAKLYTFGLQPQLDIG
npCph2b	TTLLHKL---PTIQLQGAIEEVITAFSGVGGRLYIE----QSRELYTWGDQPTLPYEL
aphyA	-----PNIMDLVK-CDGAALLYKDKIWKLGTTPS-----EFHLQEIASWLSEYH
asphyA3	-----PNIMDLVK-CDGAALLYGGKVWRRLRNAPT-----ESQIHDIWFWSDVH
asphyA4	-----PNIMDLVK-CDGAALLYGGKVWRRLRNAPT-----ESQIHDIWFWSDVH
atphyA	-----PNIMDLVK-CDGAALLYKKKIWRGLTPN-----EFHLQEIASWLCEYH
cphyA	-----PNIMDLVK-SDGAALLYKKKIWRGLTPN-----DFQLLDIASWLSEYH
cupphyA	-----PNMMMDLVK-CDGAFLYLYKSKIHRLGITPT-----DFQLQDIVYRLNEHH
gmpphyA	-----PNIMDLVK-CDGAALIYRNKVWRGLGVTPS-----EPQIREIALWLSEYH
lephyA	-----PNIMDLVK-CDGAALLYKNKIHRLGMNPS-----DFQLQDIVSWLCEYH
lsphyA	-----PNIMDLVK-CDGAALFYRNKLWLLGATPT-----EYQIREIALWMSEYH
mgphyA	-----PNVMDLVK-CDGAFLYLYKDKTYRMGTTPT-----DFQLRDIVYWLSEYH
ntphyA	-----PNIMDLVK-CDGAALLYKNNKIHRLGMTPS-----DFQLHDIVSWLSEYH
omphyA	-----PNVMDLVK-CDGAFLLHKRTKYLGLTPT-----DFQIRDIVSWLDEYH
osphyA	-----PNIMDLVK-CDGAALLYGGKVWRLOQAPT-----ESQIRDIAWFWSDVH
pcphyA	-----PNMMMDLVK-CDGAALLYKNKVYRLGATPS-----DYQLRDIVSWLTEYH
psphyA	-----PNIMDLVK-CDGAALFYRNKLWLLGATPT-----ESQIREIALWMSEYH
sbphyA	-----PNIMDLVK-CDGAALLYGDKVWRRLQAPT-----ESQIRDIAWFWSVEH
slphyA1	-----PNIMDLVK-CDGAALLYNNNKVWRGLGISTP-----DYQLQEIGGWLSDRH
slphyA3	-----PNVMDLVK-CDGAALLYNNNKIWKLGISPT-----DYQLRDIAGWLSDRH
slphyA4	-----PNIMDLIK-CDGAALLYKNKIHRLGMNPS-----DFQLHDIVSWLCEYH
stphyA	-----PNIMDLIK-CDGAALLYGGKVWRGLGTAPT-----ESQIRDIALWLSEVH
taphya	-----PNIMDLVK-CDGAALLYGDKVWRRLQAPT-----ESQIRDIAWFWSVEH
zmpphyA1	-----PSIMDLVK-CDGAALFLYHGKYYPLGVAPS-----EVQIKDIVEWLLANH
atphyB	-----PSIMDLVK-CNGAALFLYQGKYYPLGVPTP-----DSQINDIVEWLVANH
atphyd	-----PSIMDLVK-CDGAALFLYQGKYYPLGVPTP-----EAQIRDIIEWLLAfh
gmpphyB	-----PSIMDLVK-CDGAALFLYQGKYYPLGVPTP-----EAQIKDIVEWLLAYH
lephb1	-----PSIMDLVK-CDGAALYYQRKYYPLGVPTP-----EAQIKDIVEWLLAYH
lephb2	-----PSIVDLVK-CDGAALYYQGRYYPLGITPT-----AAQIKGIVEWLLTCH
npphyB	-----PSIMDLVK-CDGAALYCQGKYYPLGVPTP-----EAQIKDIVEWLLTYH
ntphyB	-----PSIMDLVK-CDGAALYCQGKYYPLGVPTP-----EAQIKDIVEWLLTYH
osphyB	-----PSIMDLVK-CDGAALYYHGKYYPLGVPTP-----EVQIKDIIEWLTMC
pbphyb1	-----PSIMDLVK-CDGAALYYQGQYYPLGVPTP-----EAQIKDIVEWLLALH
pbphyb2	-----PSIMDLVK-CDGAALYYQGQYYPLGVPTP-----ETQIKDIVEWLLTLH
sbphyB	-----PSIMDLVK-CDGAALYYHGKYYPLGVPTP-----ESQIKDIEWLTVCH
slphyB	-----PSIMDLVK-CDGAALLFCGKYYPLGVPTP-----ELQLKDIVQWLLSNH
stphyb1	-----PSIMDLVK-CDGAALYYQGKYYPLGVPTP-----EAQIKDIVEWLLAYH
stphyb2	-----PSIMDLVK-CDGAALYYQGKYYPLGVPTP-----EAQIKDIVEWLLAYH
zmpphyB1	-----PSIMDLVK-CDGAALYYHGKYYPLGVPTP-----ESQIKDIIEWLTVFH
zmpphyB2	-----PSVMDLVK-CDGAALYYRGKYYPLGVPTP-----ESQIKDIIEWLTVCH
atphyc	-----PNIMDLVK-CDGAALYYRDNLWSLGVPTP-----ETQIRDIDWVLKSH
osphyc	-----PNVMDLVK-CDGAALYYQNQLWVLGISTP-----EAEIKNIVAWLQEH
sbphyc	-----PNVMDLVK-CDGVALYYQNQLLLLGPSTS-----ESEIKSIATWLQENH
slphyc	-----PNVMDLVK-CDGAALLYQSKLWVLGITPK-----SNQIKDISQWLFEYH
taphyc	-----PNVMDLVK-CDGAALCYQNQIMVLGISTP-----EGEIKKIVAWLLECH
zmpphyC1	-----PNVMDLVK-CDGAALYYQNQNLVLGISTP-----ESEIKSIATWLQDNH
zmpphyC2	-----PNVMDLVK-CDGAALYYQNQVLVLGISTP-----ESEIKSIATWLQENH
lephyf	-----PSIMDLVK-CDGAALYCGGKCWLLGVPTP-----EAQVKDIAQWLLVAH
atphye	-----PGIMDLVK-CDGAALYYKGKCWLVGVPTP-----ESQVKDILVNWLVENH
inphye	-----PSIMDLVR-CDGAALYYNGKCWLLGVPTP-----ETQVKDIAEWLLHNH
lephyf	-----PNVMDLVK-CDGAALYYRNKLWLHGVTPT-----ESQIRDIAEWLNESH
acvphy1	-----PNIMDLVT-CDGAALYYGKCKWLLGTTPT-----EAQIVDIAAWLLDCH
acvphy2	-----PNIMDLVK-CDGAALYYGKNFWLLGTTPI-----EAQIKDLAEWLLDVH
acvphy3	-----PSIMDLVK-CDGAALYYGGRFWPLGTTPS-----EFQIRDIAEWLLGAS
appy1	-----PNIMDLVK-CDGASLYYGKKFWLLGTTPT-----EAQIKDLADWLLEVH
cphy2	-----PNIMDLVK-CDGAALYYGKRFWLLGTTPT-----ENQIKDIAEWLLEYH
mcpphy1	-----PNITDLVK-CDGAALFYHGRAWLLGVTPS-----EAQVRDIAAWLLDSH
mpphy1	-----PNIMDLVK-CDGAALYYGKRYWVLGTTPT-----ELQIKDIADWLLEYH
msphy1	-----PNVMDLVK-CDGAALLFGGRCWLLGISPT-----QEQVKDIATWLISSH
paphy1	-----PNIMDLVK-CDGAALLYGKRLWLLGTTPT-----EAQILDIADWLLEHH
ppphy0	-----PNIMDLVK-CDGAALYYGKPFWLLGTTPT-----ESQIKDIAEWLLEYH
ppphy1	-----PNIMDLVK-CDGAALYYGKRFWLLGTTPT-----ESQIKDIAEWLLEYH

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pphy2 -----PNIMDLVK-CDGAALHYGKRFWLLGITPN-----DAQIKEIADWLLEHH
 pphy3 -----PNIMDLVK-CDGAALYYGKRFWLLGTTPT-----ESQIKDIAEWLLEYH
 pphy4 -----PNIMDLVK-CDGAALYYGKRFWLLGITPN-----EVQIKEIADWFLEHH
 pphy1 -----PSIKDLVK-CDGAALYYGGMCWMLGVTP-----EAQIKDIADWLLEHH
 smphy1 -----PNIMDLVK-CDGAALYYGKRFWLLGITPS-----EAQIKDIAEWLLEHH
 aphA -----PSLLDLTS-AQGAACVFGDHCTLIGETPK-----AEDLVFLVQWLKNV
 cph1 -----DRLLGLTG-SQGAAICFGEKLLVGETPD-----EKAVQYLLQWLLENRE
 cwCph1 -----QNLLDLTS-SQGVAVCVGEEYNLIGNTPK-----EEEVKYLLQWLKKNI
 npCph1 -----QHLLDLAS-AQGAACVCFAGNCTVVGETPR-----EEDLNFLVQWLKNV
 cwCph1a -----DSFLKLIS-ARGIAICLDNKIVYKGNTPK-----KKQIKALINDFLLPK
 npCph1a -----IRLLDFVS-ASGAACVCLDNEINLVGTTPN-----IDEVRALIEWADTQV
 toCphA -----PNLLNLTS-AQGAACVCFGDRCTVIGQTPK-----EEDLNFLLQWLKNV
 aphB -----PNILDLVK-AQGAACVFGNGSCTVGQVPP-----MPDIQVLVEWMSQNI
 atBphP1 -----REDLLKQVG-ADGAALVLGDDYELVGNTPS-----REQVEELILWLGERE
 atBphP3 -----REDLLKQVG-ADGAALVLGDDYELVGNTPS-----REQVEELILWLGERE
 avAphB -----PNILDVN-AQGAACVFGNGNFRTVGQVPP-----IPDIQVLVEWMSQNI
 chBphP1 -----SNVLQLCKAAGISILIDKKEVYKSGLTPA-----DGDIQKLAEVVKHAI
 chBphP2 -----ALIMQLLD-CTGLVHIRESKVKSFGACPS-----ASSIHELVIWLMQMN
 drbphp -----LDLLGLMR-AGGLLIRFEGRWQTLGEVPP-----APAVDALLAWLETQP
 goBphP -----GELQLSLP-CNGFAVISDQTITGVLPD-----AENLHRLHDWLRLLGT
 krBphP -----PRLLQLLD-AGGAALWTGHELLTSGQVPP-----SAQLRRRIAALLARAD
 mmBphP2 -----DRFLALVG-ADSAAILTDDSVIRLGDAPA-----TDDLALIDHWFDSDQ
 paBphP -----DGIAALIP-CDGALVMLGGRTLSIRGDDE-----RQAGNVLQRLQRDP
 pfBphP -----QVLMALAN-AGGIAIIEDKQLHRYGNCP-----PEEIRALHKWLQERG
 ppBphP1 -----PRLMSLIP-CDGIGMSLLGRWSAGLAPP-----QTAVPDLLRLADMVS
 ppBphP2 -----EVLLAFAD-AQGAACVISAERCDLIGQTPP-----EAQVTALVHWLGQRD
 ppkBphP2 -----EVLLAFAD-AQGAACVISAERCDLIGQTPP-----EAQVTALVHWLGQRD
 psBphP1 -----QLLMDLVG-ATGVAIIEDRQTHCYGNCP-----PSDIRALHTWMMAGG
 psBphP2 -----QLLQALTQ-ADGAAVLIDDQVHLFGQCPT-----SEEVRALYQWIRDTG
 pssBphP1 -----QLLMDLVG-ATGVAIIEDRQTHCYGNCP-----PSDIRALHAWMIAGG
 pssBphP2 -----ELLMSTLT-ADGAAVLIDDQVLFGTCP-----IEQVRELYTWIRDTG
 pstBphP1 -----QLLMDLVG-ATGVAIIEDRQTHCYGNCP-----PSDIRALHTWMMAGG
 rcPpr -----TRLTDLFG-ATGAALSIDGHLLTVGDWPP-----PAEVAALRAWLEPRW
 r1BphP -----EALADAIP-ADGIGVWINGRALARAGIGPD-----ERSFAALVRHLMRNA
 atBphP2 -----QDFADLMP-CDGVGLWVGNNWHGHGATPP-----HDAIPRLARFVASAS
 brBphP -----QSLLQPLG-ASGAALLFEGQVMTAGDVPS-----TQRIRDLATWLDRR
 rpBphP1N -----QSILQPLH-ADGCAVLYEDQIRTIQDVPS-----TQDVREIAGWLDRQ
 rpBphP2N -----FALLELMG-ASGLCLHSREGVITIGQTPP-----GPIIDQLAQLAGRSG
 rpBphP3N -----EEMLLALMG-ASGFALCSFDGVAAFGRTPS-----DDEIQALASWLSHRE
 rpBphP4N -----PNLLDFIP-AAGVGLWIDGQFTGIGATPG-----PAQVAAMMGWLHGVP
 rpBphP5N -----DLLSALID-AGGVVVQQTGDEVATRGEEAPA-----AAPLHELTSWLRERA
 rpBphP6N -----KRIADLIP-SDGVGLWMNGVWTAHGSTPP-----ADALPSILHLLTGRA
 rrBphP -----DDTLALFGASRAVIISLDGRQWTAEGPLLEG-----APIQVPPHQRLLSER
 rsBphP1 -----QLILDLVG-ASAAVVRLAGQELHFGRTPP-----VDAMQKVLDLSQLGRPS
 rsBphP1a -----QLILDLVG-ASAAVVRLAGQELHFGRTPP-----VDAMQKVLDLSQLGRPS
 toCphB -----PNLLDLVN-ATGAACVINGEYQTLGRTPQ-----HREIEQLINWLSQLHT
 xaBphP -----PDLMDDVD-ADGVAIFHGNEISRHSVPD-----AEALRRIREHLESEH
 xcBphP -----PDLMDDVD-ADGVAIFHGNDISRHGTTPD-----VAALRRIRDHIESEH
 anFPH1 -----DDLLRLVD-ADYGALCIRGEVKILAKSPQ-----SQEMLALLEYLKVRK
 bfFPH2 -----DDLLKVFD-ADFGLLNIQDEARAIGRLRP-----YREALSILAYLQSRH
 chFPH1 -----DDLLKLNF-ADFGLLSIRDETAKLGLTLEN-----SQESLAMLEYLRMRR
 cnFPH1 -----GDLLQIFG-ADAGLLVIGDGCKLLGHSNEQ-----GQAMLAIAEYLRIKR
 gmFPH1 -----EDLLKLFD-ADFGLLSIKGETKIMGLVEQ-----SQEALAMLEYLRMRQ
 gzFPH1 -----EDLLKLFD-ADFGLLSIKGETKLMGPVEQ-----SQEALAMLEYLRMRQ
 ncFPH1 -----DDLLKLFN-ADFGMLSIREETKILGKIEQ-----SQEALAMLEYLRLK
 ncFPH2 -----HELLNLFD-CDCGFLVIEGEARTIGRLSS-----YIEAITLLKYLFFRG
 umFPH1 -----EDLLTFD-ADYGVIAVGNEAKILGPLNA-----SQEVЛАVTEFLRLKK
 aphC -----LAECLIP-GSNCVQLYTCGQQPITPEQT-----IYPLIEQYRVWQEHYT
 cph2 -----DWGNWLET-SLWQELMRGQPSAAMEPMMA-----VQSTWEKPRPFTSVAP
 npCph2a1 -----LTECLIP-GNTCIKLFICGQQPVMPQT-----IYPLIEQYSIWQEHYK
 npCph2a2 -----QEQTSPPLTQELSLVDR-AWVSPMERNNEVLLLANLREGSDVLRKGRPIEEHRLWQKYLF
 npCph2b -----DSSIIEQHP-TWQNWMTECQP-----

 arphyA T-----DSTGLSTDLSLYDAGFPKALSLG
 asphyA3 R-----DSTGLSTDLSLHDAGYPGAAALG
 asphyA4 R-----DSTGLSTDLSLHDAGYPGASALG
 atphyA M-----DSTGLSTDLSLHDAGFPRALSLG
 cpphy A M-----DSTGLSTDLSLYDAGYPGAIALG
 cupphy A M-----DSTGLSTDLSLYDAGFPGALSLG
 gmpphy A M-----DSTSFTSDLSLFAGFPSALSLG
 lephyA T-----DSTGLSTDLSLYDAGFPGALALG

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lsphya	T-----	DSTGLSTDSSL DAGFPGALSL
mgphya	T-----	DSTGLSTDSSL YDAGYPGALAFG
ntphya	T-----	DSTGLSTDSSL YDAGFPGALALG
omphya	Q-----	DSTGLSTDSSL YDAGFPGALALG
osphya	R-----	DSTGLSTDSSL HDAGYPGAAALG
pcphya	T-----	DSTGLSTDSSL YDAGYPGALALG
psphya	T-----	DSTGLSTDSSL SDAGFPGALSL
sbphya	G-----	DSTGLSTDSSL QDAGYPGAASLG
slphya1	M-----	DSTGLSTDSSL YDAGYPAALELG
slphya3	T-----	DSTGLSTDSSL HDAGYPGARSLG
slphya4	T-----	DSTGLSTDSSL HDAGYPGARSLG
stphya	T-----	DSTGLSTDSSL YDAGFPGALALG
taphya	M-----	DSTGLSTESLHDAGYPGASALG
zmphya1	G-----	DSTGLSTDSSL QDAGYPGAASLG
atphyb	A-----	DSTGLSTDSSL GDAGYPGAAALG
atphyd	S-----	DSTGLSTDSSL GDAGYPRAAALG
gmphyb	G-----	DSTGLSTDSSL GDAGYPGL PRLG
lephb1	G-----	DSTGLSTDSSL ADAGYPGAASLG
lephb2	V-----	DSTGLSTDSSL ADAGYPEAASLG
npphyB	G-----	DSTGLSTDSSL ADAGYPGAALLG
ntphyb	G-----	DSTGLSTDSSL ADAGYPGAALLG
osphyb	G-----	DSTGLSTDSSL ADAGYSGAACDLG
pphyb1	G-----	DSTGLSTDSSL ADAGYPGAASLG
pphyb2	G-----	DPTGLSTDSSL ADAGYPGAFLG
sbphyB	G-----	DSTGLSTDSSL ADAGYLGAALG
slphyb	G-----	DSTGLSTDSSL ADAGYPGALALA
stphyb1	G-----	DSTGLSTDSSL PDAGYPGAASLG
stphyb2	G-----	DSTGLSTDSSL PDAGYPGAASLG
zmphyb1	G-----	DSTGLSTDSSL ADAGYLGAAALG
zmphyb2	G-----	DSTGLSTDSSL ADAGYLGAVALG
atphyc	G-----	GNTGFTTESLMESGYPDASVLG
osphyc	D-----	GSTGLSTDSSL VEAGYPGAAALG
sbphyc	D-----	GSTGLSTDSSL VEAGYPGAAALR
slphyc	G-----	NTKGLITDSL KEAGYPGALELG
taphyc	D-----	GSTGLSTGLT LEAGYPGASALG
zmphyc1	D-----	GSTGLSTDSSL VEAGYPGAVALR
zmphyc2	D-----	GSTGLSTDSSL VEAGYPGAAALR
lephye	K-----	DSTGLSTDCL ADAGYPGAALLG
atphye	GD-----	DSTGLTTDSL VDAGYPGAISLG
inphye	G-----	DSTGLSTDCL SDAGYPGAPLLG
lephyf	G-----	DSTGLNTDSL MEAGFP GASVLG
acvphy1	K-----	DSTGLSTDSSL LAKTGYPEASCLG
acvphy2	R-----	DSTGLSTDSSL ADAGYPGAAALG
acvphy3	EEIA-	STGVCTDSL AEMGYPGAALLG
appy1	K-----	DSTGLSTDSSL ADAGYPGATAALG
cphy2	K-----	DSTGLSTDSSL ADANYPGAHL LG
mphy1	K-----	DSTGLSTDSSL ADAGYPNADSLG
mpphy1	K-----	DSTGLSTDSSL ADAGYPGAASLG
msphy1	T-----	DTGLSTDSSL VDAGYPKARELG
paphy1	R-----	DSTGLSTDSSL AEAGYPGAASLG
ppphy0	K-----	DSTGLSTDSSL ADANYPAHLLG
ppphy1	K-----	DSTGLSTDSSL ADANYPAHLLG
ppphy2	Q-----	DSTGLSTDSSL ADAGYPGAAQLG
ppphy3	K-----	DSTGLSTDSSL ADANYPAHLLG
ppphy4	Q-----	DSTGLSTDSSL ADAGYPGAAQLG
psphy1	G-----	DSTGLSTDSSL ADAGYPGAASLG
smpphy1	K-----	DSTGLSTDSSL ADAGYPGAASLG
aphA	EE-----	EVFYTDSL PQVYPDAERYK
cph1	VQ-----	DVFFTSSL SQIY PDAVNFK
cwCph1	DE-----	EVFSTPSLPHLYADARNFK
npCph1	EE-----	EVFYTDSL PQIY PDAESFK
cwCph1a	KK-----	DVFLQIFS QS HILFPEKL KKL
npCph1a	TD-----	NLFSTDSSL PKLYPEALIFK
toCphA	RE-----	EVFYTDSL PRIY PDAEKFK
aphB	HE-----	EIFATDSL ATVYPDAEKL R
atBphP1	IA-----	DVFATDNLAGNYPTAAAYA
atBphP3	IA-----	DVFATDNLAGNYPTAAAYA
avAphB	HE-----	EIFATDSL ATVYPDAEKL R
chBphP1	DK-----	EQYATHFITAE LPDFKNIT
chBphP2	FT-----	TLYATA ALTEAYEDAAAIA
drBphp	G-----	ALVQTDALGQLWPAGADLA
goBphP	NG-----	GIFVSTM LGKD YPPAAEW P

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krBphP	G-----	-APTFTDHLPTLDPGLAEV
mmBphP2	GK-----	-GFASTAHLAAQIPEAETFR
paBphP	ER-----	-DIYHTDNWPQPSEDPDGG
pfbBphP	EP-----	-VFASHHLASVYPPAAHYQ
ppBphP1	EG-----	-RIWASNRLSTVLPSAQAYF
ppBphP2	ED-----	-KVFHSDNLLRRDITELPELA
ppkBphP2	ED-----	-KVFHSDNLLRRDITELPELA
psBphP1	EP-----	-VYASHHLSSVYPPGEAYQ
psBphP2	LTRQRSKERATG-----	-LQGLGVFTDSMQRERPESAAZR
pssBphP1	EP-----	-VYASHHLSSVYAPAEAYQ
pssBphP2	LASQRSRQRATG-----	-LQGLGVFTNSMQRELADSAVYR
pstBphP1	EP-----	-VYASHHLSSVYPPGEAYQ
rcPpr	G-----	-SAGLFRSSLSSVFPDATAVR
rlBphP	AG-----	-RIYAVDRLAETYDPLEVD-
atBphP2	EG-----	-RVWATHALSQAIPEAEIYA
brBphP	KAPDA-----	-PPQGLTVTASLTLDPSFADIR
rpBphP1N	-----	-PRAAVTSTASLGVDPELAHT
rpBphP2N	GS-----	-ELFQTDRSLSTIIPPEAGAFA
rpBphP3N	SR-----	-GIFTQTQQLSASFPEAEVYS
rpBphP4N	HD-----	-GKYHTDCLALAYPPAKAFA
rpBphP5N	R-----	-PVFATDRLPNLDPAAQAVA
rpBphP6N	GN-----	-EIVATHALTDRIAATDYA
rrBphP	LG-----	-GRLRLPAELAGSFV-----
rsBphP1	P-----	-LEVLSLDDVTLRHPELPELL
rsBphP1a	P-----	-LEVLSLDDVTLRHPELPELL
toCphB	QE-----	-EVFHNTNCLSELLPEASEWK
xaBphP	HDALR-----	-EDAVGALHVDAIGEVFPELADLA
xBphP	HDALR-----	-EDAVGALHVDAIGEVFPELADLA
anFPH1	YN-----	-SVLTSNHNIVKDFQDLNYPP
bfFPH2	FT-----	-EIFSTHNITKDLPLKKDSP
chFPH1	IQ-----	-AVMTSTDIAATDFPDLRYPP
cnFPH1	FD-----	-NLNAASSSIQRDFPDLVLP
gmFPH1	LT-----	-SVVASQDVKEFPDLRYPP
gzFPH1	LT-----	-SVVASQDVSEDFPDLRYPP
ncFPH1	FS-----	-SVVTSQDIKIDFPDLRYPP
ncFPH2	SR-----	-TILFSHNIIGDDFKDLHFPS
umFPH1	FE-----	-HLVTSQDVHRDFPDMVLST
aphC	S-----	-HHDIWIAIDIYQDSTLRSLQAVF
cph2	LPPTN-----	-CVPHGYTLGELEQRSDWIAPPESL
npCph2a1	SG-----	-KYDVWAISDLYNSPDLRSLQVAF
npCph2a2	ASICPPENLENPSHKSWSVNWMAIYALTPVNELEYDSNLWAIADLYKEPLLRSVAPCF	
npCph2b	-----	-GNIWATSDLYKEPHLRLVLAFA

arphyA	DAVC--GMAAVRIS-----	SKDMIFWFRSHTAGEVRWGGAKHDPD-----DRDDARRMH
asphyA3	DMIC--GMAVAKIN-----	SKDILFWFRSHTAAEIRWGGAKNDPS-----DMDDSRMH
asphyA4	DMIC--GMAVAKIN-----	SKDIIFWFRSHTAAEIRWGGAKHDSS-----DMDDSRMH
atphyA	DSVC--GMAAVRIS-----	SKDMIFWFRSHTAGEVRWGGAKHDPD-----DRDDARRMH
cphyA	DEVC--GMAAVRIT-----	NNDMIFWFRSHTASEIRWGGAKHEHG-----QKDDARKMH
cupphyA	--LC--GMASVRIS-----	EKDWLFWFRSHTASEVRWGGVKHEP-----DDGRKMH
gmpphyA	DVVC--GMASVRT-----	AKDMVFVWFRSHTAAEIRWGGAKHEAG-----EKDDSRMH
lephyA	DAVC--GMAAVRIS-----	DKDWLFWFRSHTAAEVRWGGAKHEPG-----EKDDGRKMH
lspphyA	DTVC--GMAAVRIT-----	SKDIVFWFRSHTAAEIRWGGAKHEPG-----EQDDGRKMH
mgphyA	DGVC--GMAAVKIT-----	SNDMLFWFKAQTAEEIQWGGAKHESG-----ERDDGRKMH
ntphyA	DVVC--GMAAVRIS-----	DKGWLFWYRSHTAAEVRWGGAKHEPG-----EKDDGRKMH
omphyA	NALC--GMAAVKIT-----	DEDWLFWFRSHTAAEIRWGGAKHELE-----AKDDGRKMH
osphyA	DMIC--GMAVAKIN-----	SKDILFWFRSHTAAEIRWGGAKHDPS-----DKDDSRMH
pcphyA	DVVC--GMAVVKIT-----	SHDMLFWFRSHAAGHIRWGGAKAEPD-----ENHGRKMH
psphyA	DTVC--GMAAVRIT-----	SKDIVFWFRSHTAAEIRWGGAKHEPG-----DQDDGRKMH
sbphyA	DMIC--GMAVAKIT-----	SKDILFWFRSHTAAEIKWGGAKHDPS-----DKDDNRRMH
slphyA1	DSVC--GMAAVSIT-----	VNDMLFWFTSHTAAEIKWGGAKHEAG-----EKDDGSKMH
slphyA3	DTVC--GMAAVRIT-----	LNNMLFWFRSHTAAEVKWGGAKHETG-----EKDDGSKMH
slphyA4	DTVC--GMAAVRIT-----	PNDMLFWFRSHTAAEVKWGGAKHETG-----EKDDGSKMH
stphyA	DAVC--GMAAVRIS-----	DKDWFYWFRSHTAAEVRWGGAKHEPG-----EKDDGRKMH
taphya	DTVC--GMAVAKIN-----	SSDILFWFRSPTAKEIRWGGAKNDPS-----DMDDSRMH
zmphyA1	DMIC--GMAVAKIT-----	SKDILFWFRSHTAAEIKWGGAKHDPS-----DEDDSRMH
atphyb	DAVC--GMAVAYIT-----	KRDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
atphyd	DAVC--GMAVACIT-----	KRDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
gmpphyb	MQFV--GWQVAYIT-----	EKDFLFWFRSHTAKEIKWGGAKLILR-----TRMMGQRMH
lephb1	DAVC--GMAVAYIT-----	SKDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
lephb2	AAVC--GMAVAYVT-----	SKYFLFWFRSHTASEIKWGGAKHHPE-----DKDDWQKMH
npphyB	DAVC--GMAVAYIT-----	SKDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH

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ntphyb DAVC--GMAVAYIT-----SKDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 osphyb DAVS--GMAVAYIT-----PSDYLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 pbphyb1 NAVC--GMAVAYIT-----KRDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 pbphyb2 DAVC--GMAVAYIA-----ERDFLFWFRSHTAKEVKWGGAKHHPE-----DKDDGQRMH
 sbphyB DAVC--GMAVAYIT-----PSDYLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 slphyb DAVC--GMAVAFIT-----RSDFLFWFRSHPAKEIKWGGAKHHPE-----DKDDVQRMN
 stphyb1 DAVC--GMAVAYIT-----SKDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 stphyb2 DAVC--GMAVAYIT-----SKDFLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 zmphyb1 EAVC--GMAVAYIT-----PSDYLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 zmphyb2 DAVC--GMAVAYIT-----PSDYLFWFRSHTAKEIKWGGAKHHPE-----DKDDGQRMH
 atphyc ESIC--GMAAVYIS-----EKDFLFWFRSHTAKQIKWGGARHDPN-----DRDGKRMH
 ospphyC DVVC--GMAAIKIS-----SKDFIFFWFRSHTAKEIKWGGAKHEPID-----ADDNGRKMH
 sbphyC EVVC--GMAAIKIS-----SKDFIFFWFRSHTTKEIKWGGAKHEPV-----ADDNGRKMH
 slphyC DAVC--GMAAVRIS-----SEEMLFWFRSHTAKEIKWGGAKHEPG-----QNDERGIMH
 taphyc EVVC--GMAAIKIS-----SKGFIFFWFRSHTAKEIKWGGAKHEPGD-----ADDNGRRMH
 zmphyC1 EVVC--GMAAIKIS-----SKDFIFFWFRSHTTKEIKWGGAKHEPV-----ADDNGRRMH
 zmphyC2 EVVC--GMAAIKIS-----SKNFIFWWFRSHTTKEIKWSGAKHEPFD-----ADDNGRKMH
 1ephyc DAVC--GMATARIT-----SKDFLFWFRSHTAKEVKWGGAKHHPD-----DKDDGGKMH
 atphyc DAVC--GVAAAEFS-----SKDYLWFRSNTASAIIKWGGAKHPK-----DKDDAGRMH
 inphyc DAVS--GMATARIT-----SKDFLFWFRSHTAKEVKWGGAKHHPE-----DKDDGGRMH
 1ephycf DAVC--GMAAVKIT-----SKDFLFWFRSHTAKEIKWGGAKHLPG-----DKDDGRKMH
 acvphy1 DAVC--GLAAAKIT-----ATDFLFWFRSHTAKEVRWGGARHDPE-----ERDDGRRMH
 acvphy2 DAVC--GMAAAKIT-----TRDFLFWFRSHTAKEIKWGGAKHDPE-----DRDDGRKMH
 acvphy3 DAVC--GMAAMIT-----PNSDLFWFRSHTAKEVYWGGAEHDPQS-----RDDDSWMLQ
 apphy1 DAVC--GMAVAKIT-----PRDFLFWFRSHTAKEVKWGGAKHDPD-----DRDDGRKMH
 cpphy2 DAVC--GMAAAKIT-----AKDFLFWFRSHTAKEVKWGGAKHDP-----EKDDGRKMH
 mcpphy1 VSVC--GMAAARIT-----SKDFLFWFRSHAQKEVKWAGAQKEPGDRDREEEGGRMH
 mpphy1 DAVC--GMAAARIT-----SKDFLFWFRSHTAKEIKWGGAKHDPD-----DKDDGRKMH
 msphy1 VDVC--GMAAARIT-----ENDFLFWFRGHAQKEVKWAGAKDGGS-----EEDGSRMH
 paphy1 DAVC--GIAARIT-----SKDFLFWFRSHTAKEIIWGGAKHDPN-----DKDDGRRMH
 ppphy0 DAVC--GMAAAKIT-----AKDFLFWFRSHTAKEIKWGGAKHDPG-----ENHDDRKMH
 ppphy1 DAVC--GMAAAKIT-----AKDFLFWFRSHTAKEIKWGGAKHDPG-----EKDDGRKMH
 ppphy2 DAVC--GMAAAKIT-----SKDFLFWFRSHTAKEIKWGGAKHDPD-----EKDDGRKMH
 ppphy3 DAVC--GMAAAKIT-----SKDFLFWFRSHTAKEIKWGGAKHDPG-----EKDDNRKMH
 ppphy4 DAVC--GMAAAKIT-----PRDFLFWFRSHTAKEIKWGGAKHDPD-----EKDDGRKMH
 psphy1 DAVC--GMASARIT-----SKDFLFWFRSHTAKEKEMWGGAHKHPD-----DKDDARRMH
 smphy1 DEVC--GMAAAKIT-----AKDFLFWFRSATAKEVKWGGAKHDPD-----DKDDGRKMH
 aphA NVAS--GLLAIPIS-----QRNYVLWFRPEVIQTQTVNWGGDPNQFEVN-----KLDGNVR
 cph1 SVAS--GLLAIPIA-----RHNLLWFRPEVLQTVNWGGDPNHAYEAT-----QEDGKIELH
 cwCph1 NVAS--GLLAIKIS-----HRNYILWFRPEVIQTQTVNWGGDPSKAYEMQ-----KIDGNLRLC
 npCph1 NVAS--GLLAIPIAK-----RTYVLWFRPEVIQTQTVNWGGDPNKAEFVS-----QSEGNVR
 cwCph1a LQEFT-----
 npCph1a DTAS--GLLLLRSK-----VRYYILWFRPEVIQTQTVHWAGNPQESIKA-----EGDGSYTLS
 toCphA NVAS--GLLAIPIS-----KNYVLWFRPEVIQTQTVNWGGNPNEAEFVS-----QTEGNLRLV
 aphB DVAS--GLIALSISR-----SQKNYILWFRPEVVRTVDWGGNPHKPVEVI-----ANGEIRLS
 atBphP1 SVAS--GIIAMRVSE-----LHGSLWIWFRPEVIKTVRWGGDPHKT-----VQESGRIH
 atBphP3 SVAS--GIIAMRVSE-----LHGSLWIWFRPEVIKTVRWGGDPHKT-----VQESGRIH
 avAphB EVAS--GLIALSISR-----SQKNYVLWFRPEVVRTVDWGGNPHKPVEVI-----ANGGIRLS
 chBphP1 ASGIA--GINYHALDK-----TSNSCIMWYKPETITEVKWAGDPNKA-----EKDKNGLS
 chBphP2 SVAS--GLLAFTPVP-----DKGYEILCFRAEILQRIDWGGNPNEAIRF-----NEDMKTYH
 drBphP PSAA--GLLAISVG-----GWSECLVWLRLPELLEVWGGATPD-----QAKDDL
 goBphP ERSA--GLLAITLPF-----RPTCLIWSRVEIQTIEWAGNPHKD-----TEGSDVLR
 krBphP QTAA--GALRVGIDG-----TGWLWLRPERPRLLDWSGDPHHAETR-----VEGLEVRIS
 mmBphP2 AQAS--GVIALRVRLAWLGSSSLRLFWRREWPHLVQWAGDPTK-----GGSGGVLT
 paBphP DCC--GVLAIRFH-----QESGWIFWFRHEEVHRIRWGKPKEKLT-----IGPSGPRLT
 pfBphP QVAS--GVLAMSLPK-----PVDNGVLWFRPEVKENINWSGDPRKPLDLE-----NSDAGLRLR
 ppBphP1 NDVS--GVLIPMSQ-----HPRDYLIFFRKEVVETLDWAGDPNKYD-----SGALGDRLT
 ppBphP2 NHAG--GVLAVAISQ-----IHSHYLLWFRPEQIERTVNWAGQPTKQV-----GPQGNLD
 ppkBphP2 NHAG--GVLAVAISQ-----IHSHYLLWFRPEQIERTVNWAGQPTKQV-----GPQGNLD
 psBphP1 TLAS--GVLAMSLPK-----PVDNGVIWFRPEVKQSVQWSGDPNPKLNLD-----ASDNTLRLQ
 psBphP2 ETAS--GVIATLPK-----PVDNAVMWFRSQLASTMNWSGNPAHHVSTRA-----AGSASHGLR
 pssBphP1 PVAS--GVLAMSLPK-----PVDNGVIWFRPEVKETVQWSGDPKKPLNME-----SSAGGMR
 pssBphP2 DIAS--GVIATLPK-----PIDNAVMWFRAQLTSTMNWSGNPTHVSTRP-----ESSASHRLH
 pstBphP1 TLAS--GVLAMSLPK-----PVDNGVIWFRPEVKQSVQWSGDPNPKLNLD-----ASDNTLRLQ
 rcPpr QKAS--GCLALRLS-----GGDFVMWTRPEEPRQITWGGDPKAL-----GAAGQRP
 rlBphP --DAVAGMLAIPISR-----SPRDYVVLFRQELVRTVRWGGDPHKPVEY-----GPNPRL
 atBphP2 GTAA--GMLAIPLSQ-----VKSDYLLFFRKIEVQNLNWAGNPEKSYET-----GPMGDRLT
 brBphP SIAS--GLIAAPLSA-----SEGEYLLWFRPEQVRTVTWGGDPKAVII-----GDDPSDLS
 rpBphP1 RMAS--GVVAAPISD-----HRGEFLMWFRPERVHTVTWGGDPKKPFTM-----GDTPADLS
 rpBphP2 EVAS--GVLAVPLSRT-----PPRVRMVLWFRPEVAQTVYWAGNPDKSV-----TAESGRLR
 rpBphP3 DIAS--GLLAVPLGR-----ASTTMLWFRPEVAQTVTWGGDPHKPVQI-----GPRGRRLQ
 rpBphP4 NCAS--GLLALSLSN-----TPHNYVLWFRPEVVRVVTWAGMPNPKV-----GVDAGAPRT

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rpBphP5N	SQAS--GVLAIRPLP---DQPMLIAWLPRPEQIEDVQWAGDPRKPVEIS--DADGMQRRLR
rpBphP6N	GAAA--GMLAIPLSQ---VAGDYLLFFRKEQVQTLNWAGDPNKTYDT---GPLGDRLT
rrBphP	-----GGVLLPLSDQ---PDRDFLLLGRPETLRSIEWAGRPEKQPEI---TPEGGLKIH
rsBphP1	AAGS--GILLPLTS---GDGDLIAWFRPEHVQTITWGGNPAAEHT---WNPATQRMR
rsBphP1a	AAGS--GILLPLTS---GDGDLIAWFRPEHVQTITWGGNPAAEHT---WNPATQRMR
toCphB	DVAS--GLMALSISK---SQKSYLLWFRPEALQTVWDWAGNPHKPVEL---ADDGSLRLS
xaBphP	PLAA--GFIFVPLMP---QSRSALLWTRREQVQVQKWAGNPQLAKL---QDIPNSRLS
xcBphP	PLAA--GFIFVPLMP---QSRSALLWTRREQVQVQKWAGNPQLAKL---EDIPNSRLS
anFPH1	GFKDISGLLYVPLST---DGLDFIVFFRRGQLTEVKWGGNPNEA-----KFTEGHLE
bFPH2	AINSVAGLIVPLST---GGNDLFIVFFRRGQLREVRWAGNPYEKI-----KPAKGQYLE
chFPH1	GFHAIAGMLIVPLSV---DGEDFIVFFRKQQLRQVWKWAGNPYEKF-----KEGTEGYLE
cnFPH1	ASDTIAGLLYVPLTAK---AGQDFIVFLRKQGVREVQWAGKPYKDD-----KASEEASLE
gmFPH1	GFQVVAGLLYVPLSV---GGNDFIVFFRKQGIKEVKWAGNPYEKF-----REGTAGYLE
gzFPH1	GFQVVAGLLYVPLSV---GGSDFIVFFRKQGIKEVKWAGNPYEKF-----REGTAGYLE
ncFPH1	GFQVAGLLYVPLSV---GGNDFIVFLRKQGVREVWKWAGNPHEKTI-----QAGSAAYLE
ncFPH2	GFKAIGVLYVPLSS---TTDDCVVFYRKQIREVHWAGRPSL-----AGKIGRLE
umFPH1	GLHVIAGLLVPLSG---SGDFIAFLRKQALRHVNWAGPKF-----GKEGEAILE
aphc	QPTKIRGILIIPLEYR--QQLLGYSIFRNEIDETLWAGR-----IDQDQRQMF
cph2	SAENFQSFLIVPLAAD--QQWVGSLILLRKEKSLVKHWAGK-----RGIDRRNIL
npCph2a1	QPTKIRGILTIPQYR--QQLLGYSIFRNEVDTELWAGQ-----YDSQRQLY
npCph2a2	QTQVRGLLIVPLQHG--STIVGCLTIFRDEVDIETIWAGC-----VDTDSRQLM
npCph2b	RSTQIRGLMIVPLHYR--EQFIGVLSIFRAEFETEILWAGR-----CEQNRQQL
arphyA	PRSSFKAFLEVVKTRSLPWKDYEMDAIHSQQLILRNAFKDGEST-----DVN
asphyA3	PRLSFKAFLEVVKMKSLPWSDYEMDAIHSQQLILRGTLNDASK-----PKR
asphyA4	PRLSFKAFLEVVKMKSLPWTDYEMDAIHSQQLILRGTLNDASK-----PKR
atphyA	PRSSFKAFLEVVKTRSLPWKDYEMDAIHSQQLILRNAFKDSET-----DVN
cpphyA	PRSSFKAFLEVVKTRSLPWKDYEMDAIHSQQLILRNFTKDGT-----EIN
cupphyA	PRSSFKAFLEVETRSLPWKDYEMDAIHSQQLILRNNAFKDGT-----TVA
gmpphyA	PRSSFKAFLEVVKARSLPWPKEYEMDAIHSQQLILRNAFKDGT-----DLN
lephyA	PRSSFKAFLEVVKTRSIWPWKDYEMDAIHSQQLILRNAFKDAEV-----NSN
lspphyA	PRSSFKAFLEVVKARSVPWKDFEMDAIHSQQLILRNASKDII-----DLN
mgphyA	PRSSFKAFLEVVKTRSLPWKDYEMDAIHSQQLILRNAFKDGT-----DAT
ntphyA	PRSSFKAFLEVVKTRSRVPWKDYEMDAIHSQQLILRNASKDADAM-----DSN
omphyA	PRSSFRAFLEVVKTRSLPWKDYEMDGIIHSQQLILRNAYKESEE-----KDE
osphyA	PRLSFKAFLEVVKMKSLPWNDYEMDAIHSQQLILRGTLNDI-----KPTR
pcphyA	PRSSFKAFLEVVKTRSTTWEFEMDAIHSQQLILRKALSVKAAVAAQG-----DEIRSN
psphyA	PRSSFKAFLEVVKARSVPWKDFEMDAIHSQQLILRNASKDII-----DLN
sbphyA	PRLSFKAFLEVVKMKSLPWSDYEMDAIHSQQLILRGTLNDI-----KPVQ
slphyA1	PRSSFKAFLEVVKRRSVPWKDYEMDAIHSQQLILRNAFKDGEA-----DLN
slphyA3	PRTSFKAFLEVVKRRSVPWKDYEMDAIHSQQLILRNAFKDVEAS-----DLN
slphyA4	PRTSFKAFLEVVKRRSVPWKDYEMDAIHSQQLILRNAFKDVEAS-----DLN
stphyA	PRSSFKFGLEVVKTRSIPWKDYEMDRIHSQQLILRNAFKDADAV-----NSN
taphyA	PRLSFKAFLEVVKMKSLAWTDSEMDAIHSQQLILRGAVIDGVVK-----PTG
zmpphyA1	PRLSFKAFLEVVKMKSLPWSDYEMDAIHSQQLILRGTLNDI-----KPAQ
atphyB	PRSSFQAFLEVVKSRSPWPWETAEMDAIHSQQLILRDSFKESEAAM-----NSKVV
atphyD	PRSSFQTLEVVKSRCQPWPWETAEMDAIHSQQLILRDSFKESEAMD-----SKAAA
gmpphyB	PLSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFKDAEH-----RNS
lephb1	PRSSFKAFLEVVKSRSSSPWENAEMDAIHSQQLILRDSFKDAEA-----SNS
lephb2	PRSSFKAFLEVVKNRSLPWENAEMDAIHSQQLILRDSFKDAS-----NS
npphyB	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFKDAE-----SNS
ntpphyB	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFKDAE-----ASNS
osphyB	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFRDSAEGT-----SNSKA
pphyb1	PRSSFKAFLEVVKSRSLLLWENAEMDAIHSQQLILRDSFRDVEA-----TNS
pphyb2	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFRDAEA-----TNS
sbphyB	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFRDAEAGT-----SNSKA
slphyB	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFKDDEA-----THS
stphyb1	PRSSFKAFLEVVKSRSSSPWENAEMDAIHSQQLILRDSFKDAE-----SNS
stphyb2	PRSSFKAFLEVVKSRSSSPWENAEMDAIHSQQLILRDSFKDAE-----SNS
zmpphyb1	PRSSFKAFLEVVKSRSLPWENAEMDAIHSQQLILRDSFRDAEAGT-----NNSKA
zmpphyb2	PRSSFKAFLEVVKSRSLSWENAEMDAIHSQQLILRDSFRDAEAGT-----NNSKA
atphyC	PRSSFKAFMEIVRKSVWPWDDMEMDAINSLQLIIKGSLQEEH-----SK
osphyC	PRSSFKAFLEVVKWRSVPWPEDVEMDAIHSQQLILRGSLQDEDANK-----NNNAK
sbphyC	PRSSFKAFLEVVKWRSVPWPEDVEMDAIHSQQLILRGSLQDEDAN-----RNNVR
slphyC	PRSSFNAFLDVKWRSVPWPEDMEMDSIYSLQLIFIKCLVKNKT-----SDTSK
taphyC	PRSSFRAFLEVVKWRSVPWPEDVEMDAIHSQQLILRGSLQDEDAN-----DNNAR
zmpphyC1	PRSSFKAFLEVVKWRSVPWPEDVEMDAIHSQQLILRGSLQDEDAN-----RNNVR
zmpphyC2	PRSSFKAFLEVVKWRSVPWPEDVEMDAIHSQQLILRDSLQGEDAN-----RNNIR
lephyE	PRSSFNAFLLEVVKSRSLPWWEIPEINAIHSRQLIMRESIQENEN-----SSL
atphyE	PRSSFTAFLLEVVKSRSLPWWEIPEINAIHSRQLIMRESFTSS-----
inphyE	PRSSFIAFLLEVVKSRSLPWEDSEINAIHSRQLIMRDSLQGIGE-----NYM

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lephyf	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSQDE-----ADC
acvphy1	PRSSFKAFLEVVKQQLPWEDVEMDAIHSQQLILRGSFQDID-----SNT
acvphy2	PRSSFKAFLEVVKRRSLPWEDMEMDAIHSQQLILRGSFQDID-----SDT
acvphy3	PRSSFKAFLEIVKRRSLPWEVEVDAIRSLQQLILREDLEQFCAAVGAVKASDGDDDSLV
appy1	PRSSFKAFLEVVKRRSSPWEDVEMDAIHSQQLILRGSFQDID-----SDT
cphy2	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSFQDID-----SDT
mphy1	PRSSFQAFLEVVKQRSLPWEDVEMDAIHSQQLILRGSFQDMEGEGGG-----SQGN
mpphy1	PRSSFKAFLEVVKQRSLPWEDVEMDAIHSQQLILRGSFQDID-----SDT
msphy1	PRSSFKAFLEVVKQRSLPWEDVEMDAIHSQQLILRGSFQDIED-----KED
paphy1	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRDSFHIDID-----SDS
pphy0	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSFQDIA-----SDT
pphy1	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSFQDID-----SDT
pphy2	PRSSFKAFLEVVKRRSLPWEDIEMDAIHSQQLILRGSFQDID-----SDT
pphy3	PRSPFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSFQDID-----SDT
pphy4	PRSSFKAFLEVVKRRSLPWEDIEMDAIHSQQLISRGSFQDID-----SDT
psphy1	PRSSFKAFLEVVKRRSLPWDNVEIDAIHSQQLILRCSFRDID-----SGT
smphy1	PRSSFKAFLEVVKRRSLPWEDVEMDAIHSQQLILRGSFQDID-----SDT
aphA	PRKSFEWKETVRLTSLPWRYVEIRAALERKAIVN-----
cph1	PRQSFDLWKEIVRLQSLPWQSVEIQSALALKAIVN-----
cwCph1	PRKSFEWKETVRLTSLSWKPIEKAALGLKEAVN-----
npCph1	PRKSFEWKETVRLTSLPWKDVEVKAALERKAIVN-----
cwCph1a	-----
npCph1a	PRKSFEQWQETVRLTSLPWKGCELESAIALSNAIVGI-----
toCphA	PRKSFEWKENVQLTSLRWKAVEIKAALERKAIINI-----
aphB	PRKSFDLWKEVLLKSHPWKSHEVNAALELRSAIIGI-----
atBphP1	PRKSFEIWKEQLRNNTSFPELEAARELRGAIIGI-----
atBphP3	PRKSFEIWKEQLRNNTSFPELEAARELRGAIIGI-----
avAphB	PRKSFEWKETVLLKSHPWSYEVNAALELRSAIIGI-----
chBphP1	PRKSFEWLGEVKNQNSIPWSQPLIASSNFANFLQKHLGYIF-----
chBphP2	PRHSFEIWKEEIKS TSQFQEYEMNFAKELQRIFIET-----
drBphP	PRHSFDTYLEEKRGYAEPWHPEIEEAQDLDLTGA-----
goBphP	PRASFRTEQQTIRGHSTRWTSEQKQAARRRLRRLIADYQTQQLRELNAT-----
krBphP	PRKSFEWKSEVVGRGSTTWRSHAATADRLRTQVTGIMLGRSRGQ-----
mmBphP2	PRQSFTTWSLARGRARPWELPDLLAKTLRACLCSLKVPAA-----
paBphP	PRGSFEAEVEVVRGHSTPSETDLAIAEKLRLDMEL-----
pfBphP	PRTSFEIWKVEMAGISTKWSHGDLFANDLRRSALEN-----
ppBphP1	PRKSFAIWKETVHQQSLPWTEQDRQFGDAIRTAIVE-----
ppBphP2	PRHSFERWQEEQRGYSQAWDPLVIEGVIELRAAVLG-----
pkBphP2	PRHSFERWQEEQRGYSQAWDPLVIEGVIELRAAVLG-----
psBphP1	PRTSFEIWKVEMTGIATKWSHGDVFAANDLRRSALEN-----
psBphP2	PRQSFDVWKQEVGTGIARPWSRADLYGAEDIRRSALES-----
pssBphP1	PRTSFEIWKVEMTGIATKWSYGDVFAANDLRRSALEN-----
pssBphP2	PRQSFDVWEQEVGTGIASPWSRADLYGAEDIRRSALES-----
pstBphP1	PRTSFEIWKVEMTGIATKWSHGDVFAANDLRRSALEN-----
rcPpr	PRISFDRWVEERRGHAAPWPTWADEIATSLRHAISSDM-----
rlBphP	PRKSFEAWSELVRGRSLPFTEAERRVAETIRVTLIEV-----
atBphP2	PRKSFAIWKETVRLQAQPSEADREIAEAARIALVE-----
brBphP	PRRSFAQWHLQVEGKSEPWPAELASARLVSSETVADV-----
rpBphP1N	PRRSFAKWHQVVEGTSDPWTAAADLAARTIGQTVADI-----
rpBphP2N	PRTSFAAWTEQTHGRAIAWQPHEVAAAVERDLIIDV-----
rpBphP3N	TRASFEEAWREEVRDRSRPWSRSHIVAAEEIRDLVVDV-----
rpBphP4N	PKGCASSWQESVRLHGEWPWLDTDVDAAHRLRESLLDVVLRR-----
rpBphP5N	PRNSFALWKESVQGRAVPWRDDEKDAATRLAAIAEI-----
rpBphP6N	PRKSFSIWKEQVDGQSVWPSPDDRDTAATIQVGLREV-----
rrBphP	PRTSFSLWREEVRGRSVAFDPLDRETAETLSSLFLAERLAKQRRQ-----
rsBphP1	PRASFDWKETVTGRSLPWTSAERN CARELGEAIAAEMAQRT-----
rsBphP1a	PRASFDWKETVTGRSLPWTSAERN CARELGEAIAAEMAQRT-----
toCphB	PRKSFDLWKEIVQRQSLPWESYEIEAVWNFRSAIVGV-----
xaBphP	PRKSFDLWQQTVRGRARRWSPLHLESARSLRVLIELMERKRFQQ-----DFTLL
xcBphP	PRKSFDLWQQTVRGRARRWSPLHLESARSLRVLIELMERKRFQQ-----DFTLL
anFPH1	PRKSFQTWRETVDLRCRDWTESEVDTAAVLCVLYGKF-----
bfFPH2	PRSSFSRWTQTIKGTSKINADDFTASVSLLYGKF-----
chFPH1	PRKSFKTWSETVVGKCLEWEEEIETASVLCVLYGKF-----
cnFPH1	PRKSFKAWTETVTGCSRAWTDHQLESAGVLAGIYGKF-----
gmFPH1	PRKSFKTWNETVVGKCREWNEEQVETAAVLCVLYGKF-----
gzFPH1	PRKSFKTWHETVVGKCREWNEEQVETAAVLCVLYGKF-----
ncFPH1	PRKSFKVWYETVIGSREWSEEEVETAAVLCVLYGKF-----
ncFPH2	PRNSFKKWTENVDDGTSKAWSIEHTNLAAMAQLLYGSF-----
umFPH1	PRKSFKVWSETVEGTCRAWKDEELETASVLCVLYGKF-----
aphC	PRVSFNLWRDAKKSSQAQEWTSSEEIELAKEIGQHFASAIQQYE-----L
cph2	PLRSFEAEWETQKLV-PTWNRSERKLAQVASTQLYMAITQQF-----L
npCph2a1	PRRSFEVWRESKKAAQKWTVEEIELARDIGHFASAIQQYE-----L

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npCph2a2	PRQSFAAWRELRTGQAQQWSESEIKLAQALGERFATAVKQHR-----L
npCph2b	PQLSFEIWREQKKGLAPEWKPEDMTLAQALYDHFSMAIQQQQ-----I
aphyA	TKFIHSKLNDLKIDG-----IQELEAVTSEMVRЛИETA
asphyA3	EASLDNQIGDLKLDG-----LAELQAVTSEMVRLMETA
asphyA4	EASLDNQIGDLKLDG-----LAELQAVTSEMVRLMETA
atphyA	TKVIYSKLNDLKIDG-----IQELEAVTSEMVRЛИETA
cphyA	RKSIQTTLGDLKIEG-----RQELESVTSEMVRЛИETA
cuphyA	TNVIHAKLNDLRIDG-----LQELEAVTSEMVRЛИETA
gmpphyA	AKAINTRLRLKIEGINDLKIER-----MQELEAVTSEIVRЛDYTа
lephyA	TNSIYKKLNDLKIDG-----MQELESVTAEМVRЛИETA
lspphyA	TKAINTRLNDLKIEG-----MQELEAVTSEMVRЛИETA
mgphyA	TDVIHTRLHDLKIEG-----MEELEAVTSEMVRЛИETA
nphyA	TNIIHTKLNDLKIDG-----LQELEAVTAEMVRЛИETA
omphyA	SREIHARLNELQIDG-----VKEIEAVTSEMVRЛИETA
osphyA	AASLDNQVGDLKLDG-----LAELQAVTSEMVRLMETA
pcphyA	TDVIHTKLNDLKIEG-----IQELEAVTSEMVRЛИETA
psphyA	TKAINTRLNDLKIEG-----MQELEAVTSEMVRЛИETA
sbphyA	ASGLDNQIGDLKLDG-----LAELQAVTSEMVRLMETA
slphyA1	TSVIHSKISDLQISG-----LKELEAVTSEMVRЛИETA
slphyA3	TSVIHSKISDLQING-----LRELEAVTSEMVRЛИETA
slphyA4	TSVIHSKISDLQING-----LRELEAVTSEMVRЛИETA
stphyA	TISIHTKLNDLKIDG-----MQELEAVTAEMVRЛИETA
taphyA	KASLDEQIGDLKLDG-----LAELQAVTSEMVRLMETA
zmpphyA1	SSGLDNQIGDLKLDG-----LAELQAVTSEMVRLMETA
atphyB	DGVVQPCRDMAGEQG-----IDELGAVAREMVRЛИETA
atphyd	AGAVQPHGDDMVQQG-----MQEIGAVAREMVRЛИETA
gmpphyB	KAVVDPHVSEQELQG-----VDELSSVAREMVRЛИETA
lephb1	KAIVHA-LGEMELQG-----IDELOSSVAREMVRЛИETA
lephb2	KSIVRVQLREEGLQG-----MDELRSVAREMVRVETA
nphyB	MAVVHAQLGEMELQG-----IDELOSSVAREMVRЛИETA
nphyb	KAVVHAQLGEMELQG-----IDELOSSVAREMVRЛИETA
osphyB	IVNGQVQLGELELRG-----IDELOSSVAREMVRЛИETA
pbphyb1	KAVVHAQLEDTELQG-----MDELSSVAREMVRЛИETA
pbphyb2	KAVVHTQLKDMELQG-----MDELSSVAREMVRЛИETA
sbphyB	IVNGQVQLGELELRG-----INELSSVAREMVRЛИETA
slphyB	KAIVHDQAGDVAMQG-----IDELOSSVAKEMVRЛИETA
stphyb1	KAIVHAHLGEMELQG-----IDELOSSVAREMVRЛИETA
stphyb2	KAIVHAHLGEMELQG-----IDELOSSVAREMVRЛИETA
zmpphyb1	IVNGQVQLRELELRG-----INELSSVAREMVRЛИETA
zmpphyb2	IVNGQRQLGELELRG-----INELSSVAREMVRЛИETA
atphyC	TVVDVP-LVDNRVQK-----VDELCVIVNEMVRIDTA
osphyC	SIVTAPSDDMKKIQG-----LLELRTVTNEMVRЛИETA
sbphyC	SIVKAPPDDTKKIQG-----LLELRTVTNEMVRЛИETA
slphyC	MIVNVPGVGGPLSS-----ALKVEPLTGEVIRLIETA
taphyC	SIVEAPSDDIKKIQG-----LLELKIVTNEMVRЛИETA
zmpphyC1	SIVKAPSDDMKKIQG-----LLELRTVTNEMVRЛИETA
zmpphyC2	SIVKAPSDDMKKLQG-----LLELRTVTNEMVRЛИETA
lephyE	KTLTTSQNDADGPS-----MDELSSVAMEMVRЛИETA
atphyE	-PVLSGNGVARDAN-----ELTSFVCEMVRVIETA
inphyE	KSVSSPQQNDSDGVR-----FYELSSMALELVRVETA
lephyf	SKMIVNVPAVDTIID-----RVDTLHIN-DMVRLVETA
acphy1	KTMIHARLNDLKLQG-----LDELSTVASEMVRЛИETA
acphy2	KTMIHARLNDLKLHG-----MDELSTVANEMVRЛИETA
acphy3	PSAKKLSLKETEENGGADNSKKLERMHSAAGGGGGGRWEKMRPSSLAQEWMEAIRGT
appy1	KTMIHARLNDLKLQG-----MDELSTVANEMVRЛИETA
cphy2	KTMIHARLNDLKLHG-----MDELSVANEMVRЛИETA
mphy1	KRMINARLNDLKLQG-----MDELSTVANEMVRЛИETA
mphy1	KTMIHARLNDLKLQG-----MDELSTVANEMVRЛИETA
msphy1	RKIVHARLKEMHLQG-----MEELSSVASEMVRЛИETA
paphy1	KTMIHARLNDLRLQG-----IDELSAVTNEMVRЛИETA
pphy0	KTMIHARLNDLKLHD-----MDELSVANEMVRЛИETA
pphy1	KTMIHARLNDLKLHD-----MDELSVANEMVRЛИETA
pphy2	KTMIHARLNDLKLQD-----MDELSTVANEMVRЛИETA
pphy3	KTMIHARLNDLKLHD-----MDELSIVANEMVRЛИETA
pphy4	KTMIHARLNDLKLQG-----MDELSTVANEMVRЛИETA
psphy1	KTMVHSRLNYLRLQG-----IDELOSSVASEMVRЛИETA
smphy1	KTMIHARLNDLKLQG-----MDELSTVANEMVRЛИETA
aphA	--VLRQADELAQLAHDLERSNAEL-----
cph1	--ILRQAEELAQLARNLERSNAKL-----
cwCph1	--ILRQADELAELAHDLELSNAEL-----

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npCph1	---VLRQADELAQLAQDLERSNAEL-----
cwCph1a	-----
npCph1a	---VLSKADELAKINLELERSNQEL-----
toCphA	---VLRQADELAQLAHDLERSNAEL-----
aphB	---VLQKADELALQNLIELKRSNQEL-----
atBphP1	---VLRKTEEMADLTRELQRTNKEL-----
atBphP3	---VLRKTEEMADLTRELQRTNKEL-----
avAphB	---VLQKADELALQNLIELKRSNQEL-----
chBphP1	---LAEEEKQRQMTEILKEVNSEL-----
chBphP2	---RLKEQNRR-----
drBphP	---LGERLSVIRDLNRAALTQSNAEW-----
goBphP	---LAATLEERESLLRQK-----
krBphP	-IAIAESLQRAVLDEAPHVPGVEV-----LARYRPAEGSQLGGDW
mmBphP2	-----
paBphP	---CLNHAAEVDRMR-----
pfBphP	---DLARQVRREQEAVRAR-----
ppBphP1	---VLHNSELLASERAQADVRQ-----
ppBphP2	---VLRKAEELAQLAGELRRSNKEL-----
ppkBphP2	---VLRKAEELAQLAGELRRSNKEL-----
psBphP1	---DLARQVSKEQQAVRAR-----
psBphP2	---DLERQVREQEAVRLR-----
pssBphP1	---DLARQVREQQAVRAR-----
pssBphP2	---DLERQVREQEAVRLR-----
pstBphP1	---DLARQVSKEQQAVRAR-----
rcPpr	---MLRHLRHVKELSDQLAASNEAK-----
r1BphP	---VRLTDEVSMARQTANERQ-----
atBphP2	---AFHHSELMAGERERAEVRO-----
brBphP	---ALQLRSVR-----MVIAQDQLATISAQVLR
rpBphP1N	---VLFRAVR-----TLIAREQYEQFSSQVHA
rpBphP2N	---ILRNTEKLERINTQLARSNEEL-----
rpBphP3N	---ILGRAEELENANRELSRSNDEL-----
rpBphP4N	-DGIAERRRSAQLLQEQLMRQV-----
rpBphP5N	---AAARKGRIERINRALDASHSEL-----
rpBphP6N	---LLRQSEILSAERKKAEVRO-----
rrBphP	QAVVALEETRQLRLDAECSS-----DWLWET
rsBphP1	RAELARLRYHDPLTGLANRSYQLQERLAQDGQSAALLFIDLDRFKAVNDMSMGHVGVDG
rsBphP1a	RAELARLRYHDPLTGLANRSYQLQERLAQDGQSAALLFIDLDRFKAVNDMSMGHVGVDG
toCphB	--VLRKADELAKMVNLQRSNDEL-----
xaBphP	EASLSRSLRDGVAIIE-----RGAKGAA
xcBphP	EASLSRSLRDGVAIIE-----RGTANAA
anFPN1	-IKVWRQKEALESSSLT-----
bFPN2	-IEIWRQKESTGLNRMT-----
chFPN1	-IEVWRQKEAALQSSQLT-----
cnFPN1	-IQVWREKQTAMASNQLT-----
gmFPN1	-IEVWRQKEMALQNSKLT-----
gzFPN1	-IEVWRQKEKALQNSKLT-----
ncFPN1	-IEVWRQKEAALRSSRLT-----
ncFPN2	-IQVWREKETAINDTRLK-----
umFPN1	-ISVWRQREQALHYNQLN-----
aphC	YQQVQAFNENLEKQVKRRTVELRHTS-----EQQQAVFGVISKIRESLDTN
cph2	VTRLITQQTAYDPLTQLPNWIIFNRQLTLALLDALYEGKMGVGLVVIAMDRFKRINESFGH
npCph2a1	QQQVQVFENLEKQVKRRTVELQRTA-----EQEQAIVFKVIAEIRESLTD
npCph2a2	YEQVQALNANLEQQVDRDRTLELQQNTDLQHSTIELQRSVERQQALARIAIANMRQSLDVT
npCph2b	YKEVQALNANLELRVQEQTAELEKSL-----LLTKVIKQITEQIRRTLQ
aphyA	TVPIЛАVDSGVLNGWN-----TKIAELTGLPVDEAIG-
asphyA3	TVPIЛАVDGNGLNGWN-----QKAAELTGLRVDAIG-
asphyA4	TVPIЛАVDGNGLNGWN-----QKAAELTGLRVDAIG-
atphyA	TVPIЛАVDSGVLNGWN-----TKIAELTGLSVDEAIG-
cphyA	TVPIЛАVLDGLINGWN-----TKIAELTGLPVDKAIG-
cupphyA	MVPIIAVGVDGLNGWN-----TKIAELTGLSVDEAIG-
gmphyA	TVPIЛАVVDGLNGWN-----IKIAELTGLPIPEATG-
lephyA	LVPILAVDVDGQVNGWN-----TKIAELTGLPVDEAIG-
lsphyA	TVPIЛАVVDGTVNGWN-----IKIAELTGLPVGEAIG-
mgphyA	TVPIЛАVVDGVLNGWN-----LKIAELTGLPVDKAIG-
ntphyA	SVPIFAVDVGQLNGWN-----TKIAELTGLPVDEAIG-
omphyA	TVPIFSVGVGVLNGWN-----TKISDLTGLSVSEAIG-
osphyA	TVPIЛАVDSNGLVNGWN-----QKVAELTGLRVDEAIG-
pcphyA	TVPIFAVDADEIVNGWN-----TKIAELTGLPVQAMG-
psphyA	TVPIЛАVVDGTVNGWN-----IKIAELTGLPVGEAIG-
sbphyA	TVPIЛАVDGNGLNGWN-----QKVAELSGLRVDEAIG-

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slphya1	TVPIFAVDSDGLVNGWN-----	TKIYELTGIPVEEAVG-
slphya3	TVPILAVDADGLVNGWN-----	TKIFELTGVPVAEAVG-
slphya4	TVPILAVDADGLVNGWN-----	TKISELTGVPVAEAVG-
stphya	SVPIFAVDVDQVNNGWN-----	TKVAELTGLPVDEAIG-
taphya	TVPILAVDGNGLVNGWN-----	QKAAELTGLRVDDAIG-
zmphya1	TVPILAVDGNGLVNGWN-----	QKVADLSGLRVDEAIG-
atphyb	TVPIFAVDAGGCINGWN-----	AKIAELTGLSVEEAMGK
atphyd	TVPIFAVDIDGCINGWN-----	AKIAELTGLSVEDAMGK
gmpyb	TAPIFAVDVGHVNNGWN-----	AKVSELTGLPVEEAMGK
lephb1	TAPIFGVDVNGRINGWN-----	EKVELTGLSAEEAKGK
lephb2	TAPIFAVDVEGRINAWN-----	AKVAELTELSVEEAIGK
npphyB	TAPIFAVDVDGRINGWN-----	AKVAELTDL SVEEAMGK
ntpphyb	TAPIFAVDVEGRINGWN-----	AKVAELTDL SVEEAMGK
osphyb	TVPIFAVDTDGCINGWN-----	AKVAELTGLSVEEAMGK
pbphyb1	TAPIFAVDVDGCINGWN-----	AKVAELTGLSVDKAMGK
pbphyb2	TAPIFAVDVDGRINGWN-----	AKVAELTGLSVEEAMGK
sbphyB	TVPIFAVDTDGCINGWN-----	AKIAELTGLSVEEAMGK
slphyb	MAPIFAVDADGCINGWN-----	AKASELIGLSVEEAMGK
stphyb1	TAPIFAVDVEGRINGWN-----	AKVAELTGVSVEEAMGK
stphyb2	TAPIFAVDVEGRINGWN-----	AKVAELTGVSVEEAMGK
zmpphyb1	TVPIFAVDTDGCINGWN-----	AKIAELTGLSVEEAMGK
zmpphyb2	TVPIFAVDTDGCINGWN-----	AKIAELTGLSVEEAMGK
atphyc	AVPIFAVDASGVINGWN-----	SKAAEVTLGLAVEQAIG-
osphyc	TAPILAVDITGSINGWN-----	NKAAELTGLPVMEAIG-
sbphyc	TAPVLAVDIAGNINGWN-----	NKAAELTGLPVMEAIG-
slphyc	AVPIFSVDTVTGAINGWN-----	FKVAELTGVPMEQVIG-
taphyc	TAPILAVDIVGNINGWN-----	NKVAEITGLPTTEAIG-
zmphyc1	TAPVLAVDIAGNINGWN-----	NKAAELTGLPVMEAIG-
zmphyc2	TAPVLAVDIAGNINGWN-----	KKAAELTGLPVMEAIG-
lephye	TAPIFGVDPSGLINGWN-----	EKIADLTGLHASEAVGM
atphye	TAPIFGVDSSGCINGWN-----	KKTAEMTGLLASEAMGK
inphye	TVPIFGVDSSGLINGWN-----	AKIAELTGLQANVAIGK
lephyf	SMPVLAVDTSGRINGWN-----	SKVSELTGLPVENVIG-
acvphy1	TAPILAVDGQGLINGWN-----	GKVAELTGLCFETAMGK
acvphy2	TAPIFAVDAGGFINGWN-----	AKVAELTGLTVEEAMSR
acvphy3	GDGGASGGGGPFWDLISAFQHNSFIVVDALKPDFPIIYASTGFFNLTGYTSREVIGG	
apphy1	TAPIFAVDASGCINGWN-----	AKVAELTGLPVEEAMNR
cphy2	TAPILAVDSTGMINGWN-----	AKIAHVTGLPVSEAMGR
mcphy1	TAPILAVDSLGVNNGWN-----	AKVSELTGLPVSEAMGK
mpphy1	TAPILAVDSSGFINGWN-----	AKVAELTGLPVSEAMGR
msphy1	TAPILAVDTAGCVNNGWN-----	FKISELTGLS IPEVMGK
paphy1	TVPILAIDSNGLVNGWN-----	TKAAELTGLLADEVIGR
ppphy0	TAPILAVDSNGMINGWN-----	AKIAQVTGLPVSEAHGR
ppphy1	TAPILAVDSNGMINGWN-----	AKIAQVTGLPVSEAHGR
ppphy2	TAPILAVDSSGFINGWN-----	AKVAELTGLPVEEAMGR
ppphy3	TAPILAVDSNGMINGWN-----	AKIAQETGLPVAEAMGR
ppphy4	TAPILAVDSSGFINGWN-----	AKVAELTGLPVGEAMGR
psphy1	TAPILAVDYNGLVNGWN-----	AKVAELTGLPVGEAMGM
smphy1	TAPILAVDSSGFINGWN-----	AKVADVTGLPVTEAMGR
aphA	-----	-----
cph1	-----	-----
cwCph1	-----	-----
npCph1	-----	-----
cwCph1a	-----	-----
npCph1a	-----	-----
toCphA	-----	-----
aphB	-----	-----
atBphP1	-----	-----
atBphP3	-----	-----
avAphB	-----	-----
chBphP1	-----	-----
chBphP2	-----	-----
drBphP	-----	-----
goBphP	-----	-----
krBphP	VLPLEAGRVAIVVGDA-----	GHGVAAAAMAQLRTAL
mmBphP2	-----	-----
paBphP	-----	-----
pfBphP	-----	-----
ppBphP1	-----	-----
ppBphP2	-----	-----
ppkBphP2	-----	-----
psBphP1	-----	-----

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psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
r1BphP	-----
atBphP2	-----
brBphP	SEQPVIIADVEGRILLNE-----AEEQQLRASHPHIPHLRDLG-----
rpBphP1N	SMQPVLITDAEGRILLMND-----SFRDMLPAGPSAVHLDLA-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	TGDGTLLALVSDRINGLGDLRPEELVGRKLVDLVGGGDGGAPGVDADEIASAFDEGRAFH
rsBphP1	IEVARSLVATVRPHDLVVRLGGDEFVVLCHRLDAAGIVS LAERLRQVLEQPFEVAGRKCH
rsBphP1a	IEVARSLVATVRPHDLVVRLGGDEFVVLCHRLDAAGIVS LAERLRQVLEQPFEVAGRKCH
toCphB	-----
xaBphP	HRLMFVNPAFAELSQTEVADLIGCDILALLDDAARGKVELLEALRLGRAAYVTLPLRT
xcBphP	HRLLFVNTAFADVCGSDVAELIGRELQTLYASADPRANVELLQDALRNGRAAYVTLPLQV
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	TIFQITTKEACQLIKADR-----VSVYRFDNEWGGEFVGDFEAT
cph2	KTGDGLLQEADRLNQKLSPLAAYSPLLSRWHDGFTILLTQISDNQEMIPLCERLLSTF
npCph2a1	TIFQTTTKEVCQLIKADR-----VSVYRFDNSNWGGEFVGDFEAA
npCph2a2	TIFRTTQEVVCQLLECDR-----LSVYRFNADWGGEFVGDYETA
npCph2b	TTLQTIVSEVRSSLNSDR-----VVIFQLNSKS--VIVEEMNGN
-----	-----
arphyA	KHLLTLVEDSSVEIVKRMLENALEGTEEQNVQFEIKTHL--SRAD
asphyA3	RHILTLVEDSSVPVVQRMLYLALQGKEEKEVRFEVKTHG--PKRD
asphyA4	RHILTLVEESSVPVVQRMLYLALQGKEEKEVRFEVKTHG--PRRD
atphyA	KHFLTLVEDSSVEIVKRMLENALEGTEEQNVQFEIKTHL--SRAD
cphyA	KHLLTLVEDSSVEVRKMLFLALQGQEEQNVQFEIKTHG--SHIE
cupphyA	NHLLTLVEDSSVHTVKMLNLALQGEEEKNVQFEIKTHG--IRSE
gmpphyA	KHLLTLVEDSSDRVVKMLNLALLGEEEKNVQFEIKTLG--SKMD
lephyA	KHLLTLVEDSSVDTVKMLLEALALQGKEEKNVFEIKTHG--PSRD
lspphyA	KHLLTLVEDSSTDIVVKMLNLALQGEEEKNVQFEIKTHG--DQVE
mgphyA	RDLLSLVEDSSTGIVKKMLDLALQGKEEQNIQFELKTDE--SRRD
ntphyA	NHLLTLVEDSSVDTVSKMLELALQGKEERNVFEIKTHG--PSGD
omphyA	MHFLALVEDSSADTVSKMLGLALQGKEEHDVQFEIKTHG--QRSE
osphyA	RHILTVVEESSVPVVQRMLYLALQGKEEKEVKFEVKTHG--SKRD
pcphyA	KHLLTLVEDSSDVTVKMLFLALQGKEEQGIPFEFKTYG--SRED
psphyA	KHLLTLVEDSSTDIVVKMLNLALQGEEEKNVQFEIKTHG--DQVE
sbphyA	RHILTLVEDSSVSIVQRMLYLALQGKEEKEVRFEIKTHG--SKRD
slphyA1	KHIAALVEDSSIDNVKQMLQSAHQGEEKKNVQFEVKRHH--SIPD
slphyA3	KHIAASAELESSIDNVKRMQLQALQGEEKKNVQFEIKRHQ--SNPD
slphyA4	KHIAASAELESSIDNVKRMQLQALQGEEKKNVQFEIKRHQ--SNPD
stphyA	KHLLTLVEDSSVDTVKMLLEALALQGQEERNVFEIKTHG--PSRD
taphya	RHILTLVEESSSVVQRMLYLALQGKEEKEVKFEVKTHG--PKRD
zmphyA1	RHILTLVEDSSVPIVQRMLYLALQGREEKEVRFEIKTHG--SKRD
atphyb	SLVSDLIYKENEATVNKLLSRALRGDEEKVNVEVKLKTFS--PELQ
atphyd	SLVRELIYKEYKETVDRLLSCALKGDEGKVNVEVKLKTFG--SELQ
gmpphyb	SLVHDLVFKESSEETVNKLLSR---EEDKNVETKMRTFG--KEHQ
lephb1	SLVHDLLYKESQESAELLYNALRGVEGKVNVEIKLRTFG--AEQV
lephb2	SLVHDLVHEESQTTAQNLRKALRGEEDKNIEIKLRTFG--AEQL
npphyB	SLVHDLVHEESQETAENLLFNALRGEEDKNVEMKLRTFG--SEQP
ntphyb	SLVHDLVHKESQETAELLFNALRGEEDKNVIEIKLRTFG--PEQL
osphyb	SLVNDLIFKESEETVNKLLSRALRGDEDKNVIEIKLKTFG--PEQS
pbphyb1	SLVHDLVYKEYEETVDKLLHRALRGEEDKNVIEIKLRTFG--SEHQ
pbphyb2	SLVHDLVYKEYEEIVDKLLHRALRGEEDKNVIEIKLRTFC--SEHQ
sbphyB	SLVNDLIFKESEEIVEKLLSRALRGEEDKNVIEIKLKTFG--SEQS
slphyb	SLVHDLVCKEDSKVNTQELLHALQGEDEDKNVIEIKLKAEG--SQQH
stphyb1	SLVHDLVYKESQETAELLYNALRGEEKNVIEIKLRTFG--AEQL
stphyb2	SLVHDLVYKESQETAELLYNALRGEEKNVIEIKLRTFG--AEQL

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zmphyb1 -----SLVNDLIFKESEATVEKLLSRALRGEEDKNVEIKLKTFG-- SEQS
 zmphyb2 -----SLVNDLIFKECDDIVEKLLSRALRGEEDKNVEIKLKTFG-- SEQS
 atphyc -----KPVSDLVEDDSVETVKNMLALALEGSEERGAEIRIRAFG-- PKRK
 ospphy -----KPLVLVIDDSVEVVVKQILNSALQGIEEQNLQIKLKTFN-- HQEN
 sbphyd -----RPLIDLVVVDSIEVVVKRILDSALQGIEEQNLLEIKLKAFH-- EQEC
 slphyd -----SQLVDVVVEGTVEVLKNILSSALQGTEEKNVEIRLRTLG-- SHGK
 taphyc -----MLLVDLVEGDSVEVVVKQMLNSALQGTEEQNLLEIKLKTMH-- QQES
 zmphyd1 -----RPLIDLVTDSIEVVVKQILDSALQGIEEQNLMEIKLKTFH-- EHEC
 zmphyd2 -----RPLIDLVVADSVEVVVKQILDSALQGIEEQNLLEIKLKTFH-- EQEC
 lephye -----SLINDITHEDSRGTVEKVLHALLGEEKNVEIKLRRFG-- KDPP
 atphye -----SLADEIVQEESRAALESLLCKALQGEEFKSVMLKLRKFG-- QNNH
 inphye -----YLIDDVTHEDSHETFKALMCRALQGEEEDRNVEVLLLKFG-- NHPT
 lephyf -----VPLVDLVIGGTTNTIKRVLSLALQGKEEKNVEIKLRTLG-- PQEK
 acvphy1 -----SLAKELVREESKTIVVERVRLALEGEEEQDIEIHLRTYD-- QHKQ
 acvphy2 -----SLVRDVVVNASMETAERVLALQGEEQNVEIKLKTYG-- DQAI
 acvphy3 NCRFLQGPDTNPADVASIREALAQGTGFCGRLLNYRKDGSSFVNLLTIAPIKDDL-----
 apphy1 -----SLIRDLVDEAVESVERLLYLAQGEEEQNVEIKLKTYG-- DQAE
 cpphy2 -----SLVKDLVLDENVVVVERLLYLASQGEEEQNVEIKLKTFG-- TQTE
 mcphy1 -----SLVKDLVQRESREAVERVLYMALNGEEEQNVEIKLKTFG-- TQTE
 mpphy1 -----SLVKDLALEESVETVERLLYLAQGEEEQNVEIKLQTYG-- AQKD
 msphy1 -----SLVKDLTHPSSKDTVEKLLYMALNGEEEQNVEIRLKTWG-- MQQG
 paphy1 -----PLI-DLVQHDSVEIVKKMLYLAQGEEEQNVEIKLKTFG-- IQEE
 ppphy0 -----SLVKDLVTDENVVVERLLYLAQGEEEQNVEIKLKTFG-- TQTE
 ppphy1 -----SLVKDLVTDENVVVERLLYLAQGEEEQNVEIKLKTFG-- TQTE
 ppphy2 -----SLVKDLILNESIDVVQRLLHLALQGDEEQNIEIQLKTFG-- PQKE
 ppphy3 -----SLVKDLVMDESLEVVERLLYLAQGEEEQGVEIKLKTFG-- AQTV
 ppphy4 -----SLVKDLILEESIDVVQRLLYLAQGEEEQNIEIQLKTFG-- PQKE
 psphy1 -----SLVQDLVFEQSVERVEKMLHNALRGEEEKNVEMLKTFG-- PQKE
 smphy1 -----SLAKELVLHESADMVERLLYLAQGDEEQNVELKLKTFG-- GQKD
 aphA -----
 cph1 -----
 cwCph1 -----
 npCph1 -----
 cwCph1a -----
 npCph1a -----
 toCphA -----
 aphB -----
 atBphP1 -----
 atBphP3 -----
 avAphB -----
 chBphP1 -----
 chBphP2 -----
 drbphp -----
 goBphP -----
 krBphP -----RAYLLEGHPASALDRDLTLVSTLLGNHTATALIAVVHPA-- GDHA
 mmBphP2 -----
 paBphP -----
 pfBphP -----
 ppBphP1 -----
 ppBphP2 -----
 ppkBphP2 -----
 psBphP1 -----
 psBphP2 -----
 pssBphP1 -----
 pssBphP2 -----
 pstBphP1 -----
 rcPpr -----
 rlBphP -----
 atBphP2 -----
 brBphP -----AYCTAPAEFRANLDDLMRNKRSGEELTLGGATPQRPLMVRADP
 rpBphP1N -----GFFVESNDFLRNVAELIDHGRGWRGEVLLRGAGNRPLPLAVRADP
 rpBphP2N -----
 rpBphP3N -----
 rpBphP4N -----
 rpBphP5N -----
 rpBphP6N -----
 rrBphP GLTVSLALLGRGQWWVRLSGVPQYDG-----
 rsBphP1 ISASIGIAMDSIGLDDLVRAADIAMYAAKKNGNMRGEFLFRPSLYEETTQLVELNDNMRG
 rsBphP1a ISASIGIAMDSIGLDDLVRAADIAMYAAKKNGNMRGEFLFRPSLYEETTQLVELNDNMRG
 toCphB -----
 xaBphP -----RDGAPVYRQFHLEPLPSPSSITAHWLLQLRDPE-----
 xcBphP SDGAPVYRQFHLEPLPSPSGVTAHWLLQLRDPE-----

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anFPH1	-----
bFPFH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	SP-----HWSNESKISINTVWNNDTLQNTQGGRYRYNETFAVDDIYKVGFTQ
cph2	QEPFFLQGQPQPIYLTASMGISTAPYDGETAESLLKFAEIALTRAKCQGKNTYQFYRPQDSA
npCph2a1	SP-----YWSNESEIGINTVWNNDTLQDTTEGGRYRNNETFAVDDIYKMGFAK
npCph2a2	NP-----RWGRSIKLGVMWDDTYLQETQGGRYRNNETFVDDIHSQGFTQ
npCph2b	-----WQSVLGVNA---PPECFPNEHRDLYSQGRVRAINNVSTDLS
arphyA	A-----GPISL VNACASRDLHENVV GVCFAHDLTGQKTVMDKTRIEGDYKAIIQNPN
asphyA3	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRIEGDYKAIIHNP
asphyA4	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRIEGDYKAIIHNP
atphyA	A-----GPISL VNACASRDLHENVV GVCFAHDLTGQKTVMDKTRIEGDYKAIIQNPN
cpphyA	V-----GSISL VNACASRDLRENVV GVFVAQDITGQKVMMDKTRIEGDYKAIQNPN
cupphyA	C-----GPISL VNACASRDVQE SVVGVCFIAQDITGQKTVMDKTRIEGDYRAIIQNPN
gmphyA	S-----GPISL VNRCA SRDLRDNVVGVCFVAHDITAQKNVMDKFIRIEGDYKAIQNPN
lephyA	S-----SPISL VNACASKRDRDNVVGVCFMAHDITGQKSIMDKTRIEGDYRAIIQNPN
lspphyA	F-----GPISL VNACASRDLRENVV GVCFAQDITAQKTVMDKTRIEGDYKAIQNPN
mgphyA	S-----GPISL VNACASRDHHENVV GVCFAQDITGHKTVMDKTRIEGDYKAIQNPN
ntphyA	S-----SPISL VNACASRDVGSVVGVCFIAQDITGQKNIMDKTRIEGDYRAIIQNPN
omphyA	S-----GPISL VNACASKDVKENVV GVCFIAQDITTQKSIMMDKTRIEGDYRSIIQNPN
osphyA	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRVEGDYKAIIHNP
pcphyA	S-----VPITVV NACATRGLHDHV GVCFAQDVT SQKTMIDKTRI QGDYKAIQNPN
pshphyA	S-----GPISL VNACASKDLRENVV GVCFAQDITAQKTVMDKTRIEGDYKAIQNPN
sbphyA	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRIEGDYKAIQNPN
slphyA1	S-----GPISL VNACASKDVNGNVVGVCCLI AQDITGQKTVMDKFLRIEGDYKAIQSPN
slphyA3	S-----SPISL VNACASKDVNGNVVGVCЛИTQDITGQKTVMDKTRIEGDYKAIQSPN
slphyA4	S-----GPISL VNACASKDVNGNVVGVCCLI AQDITGQKTVMDKTRIEGDYKAIQSPN
stphyA	S-----SPISL VNACASKDVRSVVGVCFIAQDITGQKSIMDKTRIEGDYRAIIQNPN
taphya	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRVEGDYMAIIHNP
zmpphyA1	D-----GPVIL VNACASRDLHDHV GVCFAQDMTVHKLVMDKTRVEGDYRAIIHNP
atphyb	G-----KAVFVV NACSSKDYLNNIVGVCFVGQDVT SQKIVMDKFINI QGDYKAIHVSPN
atphyd	G-----KAMFVV NACSSKDYLNNIVGVCFVGQDVT GHKIVMDKFINI QGDYKAIHVSPN
gmphyb	N-----KAALFVV NACSSKDHTNNVV GVCFVGQNTVGQKIVMHKFINI QGDYKAIHVSPN
lephb1	E-----KAVFVV NACSSRDYTNSIVGVSFVGQDVT GEKIVMDKFIFI QGDYKAIHVSPN
lephb2	K-----KTFVFEVNACSNKDYTNNIVGVSFIGQDITAQKVVLDFKVRQGDYKAIMHSPN
npphyB	K-----KAVFVV NACSSKDYTNNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
ntphyb	K-----KAVFVV NACSSKDYTNNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
osphyb	K-----GPIFVIVNACSTRDYTKNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
pbphyb1	K-----KALFVV NACSSKDYMNNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
pbphyb2	K-----KAVFVV NACSSKDYMNDIVGVCFVGQDITGQKVVMMDKFIFI QGDYKAIHVSPN
sbphyB	N-----GAIFVIVNACSSRDYTQNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
slphyb	K-----KAVFVV NACCSKDYTNNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPS
stphyb1	E-----KAVFVV NACRDYTNNIVGVCFVGQDVTGEKVVMDKFIFI QGDYKAIHVSPN
stphyb2	E-----KAVFVV NACASKDYTNNIVGVCFVGQDVTGEKVVMDKFIFI QGDYKAIHVSPN
zmpphyb1	K-----GPIFVIVNACSSRDYTQNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
zmpphyb2	K-----GAIFVIVNACSSRDYTQNIVGVCFVGQDVTGQKVVMMDKFIFI QGDYKAIHVSPN
atphyc	S-----SPVELV NTCCSRD TNVL GVCFIGQDVTGQKTLTENYSRVKGDYARIMWSPS
osphyc	N-----GPVILM VNACCSRDLSEKVV GVCFAQDMTGQNIIMDKYTRI QGDYVAIVKNPS
sbphyc	N-----GPIILMVNACCSRDLSEKVI GVCFIGQDVTGQKLMIDKYTRI QGDYVAIVKNPS
slphyc	T-----SYVVL VNACCSRDL DENVENGTICFGQDVT EKRVIDQITEL QGDYSGIMRNPC
taphyc	K-----GPVVL MVNACCSRDLSDKVV GVCFAQDLTGKHMVMDKYTRI QGDYVAIVKNPN
zmpphy1	N-----GPVIL VNACCSRDLSEKVI GVCFAQDLTRQKMIIMDKYTRI QGDYVAIVKNPT
zmpphy2	C-----GPVILM INSCCSRDLSEKVI GVCFAQDLTRQKMIIMDKYTRI QGDYVAI IKNPS
lephye	-----GSVIYLVINACTSRDHNGVVGVGSFVAQDVPEKFIIMDKFQLRGDYEAIVQSL
atphye	PDY-----SSDVCVL VNACCSRDLSEKVI GVCFIGQDITSEKAIDR FIRL QGDYKTIVQSLN
inphye	-----KEVYLV VNACCSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYEAI IQSLN
lephyf	V-----GSISIV VNACCSRDFKQNI VGVCFTGKDVTGLKL KDKYTSRVQGDYVGIIHSPS
acvphy1	K-----GVVIL VNACCSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN
acvphy2	K-----GPVIL VNACSSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN
acvphy3	-----GSIVKLIGVQLEVKY TEGIRANNRPNMPQSLIRYDVRHQDKVS AFIAQLVA
appy1	K-----GPVIL VNACSSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN
cpphy2	K-----EAVIL VNACSSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN
mphy1	G-----GTVI L VNACASRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN
mphy1	K-----GAVI L VNACSSRDLSEKVI GVCFIGQDITPEKAVMDKFVRL QGDYVAIVQSLN

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msphy1	K-----GPVILMVNACASRDVSEKVVGVCFVAQDVTRGEKIVQDKFTRIQGDYTTIVRSNH
phy1	K-----GPVVLIVNACSSRDLLEENVVGVCFVAQDVTRWQRIAMDKFTHLQGDYRAIVQNPN
pphy0	K-----GVVILIVDACSSIHVSENVVGVCFVGQDVTGQKMFMDKFTRIQGDYKTIVQNPH
pphy1	K-----GVVILIVDACSSIHVSENVVGVCFVGQDVTGQKMFMDKFTRIQGDYKTIVQNPH
pphy2	K-----GAVILIVNACSSRDVQDNVVGVCFVGQDVTGQKQVLDKFTRIQGDYKAIVQNPN
pphy3	K-----GAVILIVNACSSRDVSENVGVCFVGQDVTGQKMFMDKFTRIQGDYKTIVQNPH
pphy4	K-----GAVILIVNACSSRDVQDNVVGVCFVGQDVTGQKQVLDKFTRIQGDYKAIVQNPN
psphy1	K-----EAVILVVNACSSRDFTDNIVGVCFVGQDVTSQKVVMDFKIRIQGDYRSIVQSPN
smphy1	K-----EAVILVVNACASRDVSDNVVGVCFVGQDVTGQKVMEKFTRIQGDYKAIVQNPN
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drbphp	-
goBphP	-
krBphP	-
mmBphP2	-
paBphP	-
pfBphP	-
ppBphP1	-
ppBphP2	-
ppkBphP2	-
psBphP1	-
psBphP2	-
pssBphP1	-
pssBphP2	-
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	VIAPHDRVLFVLIFSDLTERKTAEAARARFQEEDGARRPSLRLDQSASLIYKELAAST
rpBphP1N	VTRTEDQSLGFVLIFSDATDRRTADAARTRFQEGILASARPGVR LDSKS DLLHEKLLSAL
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	A-----IESEQFHLYQPIFALNPETERLVGFALLRWDHPLH GALQPGIFIPLAERLGH
rsBphP1a	A-----IESEQFHLYQPIFALNPETERLVGFALLRWDHPLH GALQPGIFIPLAERLGH
toCphB	-
xaBphP	-
xBphP	-
anFPH1	-
bfFPH2	-
chFPH1	-
cnFPH1	-
gmFPH1	-
gzFPH1	-
ncFPH1	-
ncFPH2	-
umFPH1	-
aphc	CHVENLEQFQIYAFVLA PMLDRLTESDLRQALTNQEFVLYFQPVALDTGKLLG V
cph2	CHIDNLEQFQIHA V
npCph2a1	CHIEILEQFHVQAFMIAPIFGQELWGLL CHREFLQLIQANLTVPINIGIELWG LIAHECNTPRNWQDV EIDL
npCph2a2	CHIEILEQFHVQAFMIAPIFGQELWGLL CHREFLQLIQANLTVPINIGIELWG LIAHECNTPRNWQDV EIDL
npCph2b	CHREFLQLIQANLTVPINIGIELWG LIAHECNTPRNWQDV EIDL
aphyA	PLIPPIFGTDEFGWCTEWNPAMSKLT---GLKR-----EEV
asphyA3	PLIPPIFGADEFWGWCSEWNAAMTKLT---GWR-----DEV
asphyA4	PLIPPIFGADEFWGWCSEWNAAMTKLT---GWR-----DEV
atphyA	PLIPPIFGTDEFGWCTEWNPAMSKLT---GLKR-----EEV

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cpphya	PLIPPIFGSDEFGWCSEWNPAMAKLT---GWSR-----EEV
cuppya	PLIPPIFGTDEFGWCSEWNSAMTKLS---GWRR-----DEV
gmphya	PLIPPIFGTDEFGWCCEWNPAMMKLT---GWKR-----EEV
lephya	PLIPPIFGTDQFGWCSEWNTAMTKLT---GWRR-----DDV
lsphya	QLIPPIFGTDEFGWCCEWNNAAMIKL-----GWKR-----EEV
mgphya	PLIPPILGTDEFGWCSEWNLAMEKIS---GWRN-----EDV
ntphya	PLIPPIFGTDQFGWCSEWNSAMTKLT---GWRR-----DDV
omphya	PLIPPIFGTDEFGWCSEWNNAAMIKL-----GWGR-----EAV
osphya	PLIPPIFGADEFGWCSEWNNAAMTKLT---GWHR-----DEV
pcphya	PLIPPIFGTDEFGWCSEWNQAMTELS---GWRR-----EDV
psphya	QLIPPIFGTDEFGWCCEWNNAAMIKL-----GWKR-----EEV
sbphya	PLIPPIFGADQFGWCSEWNVAMTKLT---GWHR-----DEV
slphya1	PLIPPIFGTDEFGWCSEWNPAMAKLT---GWTR-----EEV
slphya3	PLIPPIFGTDEFGWCSEWNPAMAKLT---GWSR-----EEV
slphya4	PLIPPIFGTDEFGWCSEWNPAMAKLT---GWSR-----EEV
stphya	PLIPPIFGTDQFGWCSEWNSAMTMLT---GWRR-----DDV
taphya	PLIPPIFGADESGWCCEWNNAAMTKLT---GWHR-----EEV
zmphya1	PLIPPIFGADQFGWCSEWNNAAMTKLT---GWHR-----DEV
atphyb	PLIPPIFAADENTCCLEWNMAMEKLT---GWSR-----SEV
atphyd	PLIPPIFAADENTCCLEWNTAMEKLT---GWPR-----SEV
gmphyb	PLIPPIFASDDNTCCLEWNTAMEKLD---PSENENVTV-----GGVDV
lephb1	PLIPPIFASDENTSCSEWNNTAMEKLS---GWSR-----EEI
lephb2	PLIPPIFVSDENTCCFEWNNTAMEKLS---GWNK-----EEI
npphyB	PLIPPIFVSDENTCCSEWNNTAMENLT---GWSR-----GEI
ntphyb	PLIPPIFASDENTCCSEWNNTAMEKLT---GWSR-----GEI
osphyb	PLIPPIFASDENTCCSEWNNTAMEKLT---GWSR-----GEV
pphyb1	PLIPPIFASDENTCCLEWNTAMEKFT---GWSR-----GEV
pphyb2	PSIPPIFASDENTCCLEWNTAMEKLT---GWSR-----GEV
sbphyB	PLIPPIFASDENTSCSEWNNTAMEKLT---GWSR-----GEV
slphyb	PLIPPIFASDENSCTCEWNNTAMEILT---GYGK-----EDV
stphyb1	PLIPPIFASDENTCSEWNNTAMEKLT---GWSR-----GEI
stphyb2	PLIPPIFASDENTCSEWNNTAMEKLT---GWSR-----GEI
zmphyb1	PLIPPIFASDENTCSEWNNTAMEKLT---GWSR-----GEV
zmphyb2	PLLPIPIFASDENTCSEWNNTAMEKLT---GWSR-----EEV
atphyc	TLIPPIFITENGVCSEWNNAAMQKLS---GIKR-----EEV
osphyc	ELIPPIFMINDLGSCLEWNNEAMQKIT---GIKR-----EDA
sbphyc	ELIPPIFMINDLGSCLEWNKAMQKIT---GIQR-----EDV
slphyc	HLIPPIFLIDDQGVGLEWNDAMAKIS---GLSK-----EYT
taphyc	ELIPPIFMINDLGSCLEWNNEAMQKIT---GIKR-----EDA
zmphyc1	ELIPPIFMINDLGSCLEWNKAMQKIT---GIKR-----EDA
zmphyc2	ELIPPIFMINDLGSCLEWNKAMQKIT---GMKR-----EDA
lephye	PLIPPIFASDENACCSEWNNAAMERLT---GWTK-----YEV
atphye	PLIPPIFASDENACCSEWNNAAMEKLT---GWSK-----HEV
inphye	PLIPPIFASDENACCSEWNNAAMERLT---GLVK-----CEV
lephyf	PLIPPIFVMDEQGRCVEWNDAHKLT---GSKR-----EEV
acvphy1	PLIPPIFGADEYGCSEWNNAAMEKLS---NWRR-----EEV
acvphy2	PLIPPIFGADEFGYCSEWNPAMEKFS---GWKR-----EDV
acvphy3	ALTKPDKVETPRLSSAMRFLSTQQTIESLPQPTAIPREGGGRTRRPRSSSFLSLLGMEKE
appy1	PLIPPIFGADEFGFCSEWNPAMEKLS---GWKR-----EDV
cphy2	PLIPPIFGGDEYGCFEWNPAMEALT---GWKH-----DEV
mphy1	SLIPPIFGSDEYGCTEWNPAMEKLT---GVR-----EDV
mpphy1	PLIPPIFGSDEFGYCSEWNPAMEKLA---GWKR-----EEV
msphy1	SLIPPIFGSDESGFCVEWNPAMERLS---GVKR-----EEA
paphy1	PLIPPIFGADEYGCSEWNPAMEKLT---GWKR-----EEV
ppphy0	PLIPPIFGADEFGYCCEWNPAMEGLT---GWKK-----DEV
ppphy1	PLIPPIFGADEFGYCCEWNPAMEGLT---GWKK-----DEV
ppphy2	PLIPPIFGTDEYGCSEWNPSMEKLT---GWKR-----EEV
ppphy3	PLIPPIFGADEFGYCCEWNPAMEGLT---GWKR-----DEV
ppphy4	PLIPPIFGTDEYGCSEWNPSMEKLT---GWKR-----EEV
psphy1	PLIPPIFASDEYACCSEWNNAAMEKVT---GWTH-----DEV
smphy1	PLIPPIFGADEFGYCSEWNPAMEKLS---GWRR-----EEV
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

chBphP1	-----
chBphP2	-----
drBphP	-----
goBphP	-----
krBphP	GHLPPLLVDAAGTSVVHVPSRPMGL---GFGP-----TAGL
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	VENAQLAALEVTHGAEAGSMPEMLESIRNSTARTLGILEHLWYRSQSEE-----
rpBphP1N	VENAQLAALEITYGVETGRIAELLEGVRQSMLRTAEVLGHLVQHAARTAGSDSSNGSQN
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	IHAMGNWLRRAILQLQAFRSAGPELDLKMNVNVSPLQLARPDFLARLADLLAQVPDLPR
rsBphP1a	IHAMGNWLRRAILQLQAFRSAGPELDLKMNVNVSPLQLARPDFLARLADLLAQVPDLPR
toCphB	-----
xaBphP	-----
xBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	QAELL-----
cph2	LAEELGLINHLGQWLETACATHQHFFRETGRRRLMAVNISARQFQDEKWLNNSVLECLKR
npCph2a1	QAELLTQTRQTLNLQQAAEQQ-----RVLF-----EVVAKVRKSLD
npCph2a2	QAELYEQVRAQTRKLALVAEQQ-----QTLA-----SVITKIRESLD
npCph2b	QAQLYEQTCKAE-----
arphyA	ID-----
asphyA3	LD-----
asphyA4	LD-----
atphya	ID-----
cpphya	ID-----
cupphya	ID-----
gmphya	MD-----
lephya	MD-----
lsphya	MD-----
mgphya	IN-----
ntphya	ID-----
omphya	ID-----
osphya	IN-----
pcphya	MN-----
psphya	MD-----
sbphya	ID-----
slphya1	ID-----
slphya3	ID-----
slphya4	ID-----
stphya	MD-----
taphya	LD-----
zmphya1	ID-----
atphyb	IG-----
atphyd	IG-----

Rockwell, Su, and Lagarias Supplemental Figure 1

gmpphyb	IG-----
lephb1	VG-----
lephb2	IG-----
npphyB	IG-----
ntpphyb	IG-----
osphyb	VG-----
pbpphyb1	IG-----
pbpphyb2	VG-----
sbphyB	VG-----
s1phyb	IG-----
stphyb1	VG-----
stphyb2	VG-----
zmpphyb1	VG-----
zmpphyb2	VG-----
atphyc	VN-----
osphyc	VD-----
sbphyc	ID-----
s1phyc	VG-----
taphyc	ID-----
zmpphyC1	IN-----
zmpphyC2	IN-----
lephye	MG-----
atphye	IG-----
inphye	IG-----
lephyf	ID-----
acvphy1	LG-----
acvphy2	IG-----
acvphy3	KDIPEEDELQELEVIMLEDASVGRPGSLDDPERTRRGIDLATTLERIGKSFVITDPRLLD
appy1	LG-----
cphy2	VG-----
mphy1	IG-----
mpphy1	IG-----
msphy1	IG-----
paphy1	IG-----
ppphy0	VG-----
ppphy1	VG-----
ppphy2	IG-----
ppphy3	IG-----
ppphy4	LG-----
psphy1	IG-----
smpphy1	LG-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drBphP	-----
goBphP	-----
krBphP	VS-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

rpBphP1N	KK-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	HALCLEITETSLSDEAVSEALISIRALGVRIAIDDFGTGFSSLACLRRLPVDVAKLDRAF
rsBphP1a	HALCLEITETSLSDEAVSEALISIRALGVRIAIDDFGTGFSSLACLRRLPVDVAKLDRAF
toCphB	-----
xaBphP	-----
xBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----
cph2	TGMPPEDLELEITESLMMEDIKGTVVLLHRLREEGVQVAIDDFGTGYSSLSILKQLPIHR
npCph2a1	LDAIFQTTTQEICKSLQADRVAVFQFQADWSEYIAEFVGDGWKLGVSNKTVWQDSYL
npCph2a2	LNAIFETTTQELRRVLNCDRVVIFRFYSE-SNYDGGEVIAEDVAERFLSTLTAKVYDRCL
npCph2b	-----
-----	-----
arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphyA	-----
lephyA	-----
lsphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyd	-----
gmphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntphyB	-----
osphyB	-----
pbphyb1	-----
pbphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyc	-----
osphyc	-----
sbphyc	-----
slphyc	-----
taphyc	-----
zmpphyC1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

zmpphy2	- - - - -
lephye	- - - - -
atphye	- - - - -
inphye	- - - - -
lephyf	- - - - -
acvphy1	- - - - -
acvphy2	- - - - -
acvphy3	NPIIFASDRFELTEYTREEVLGNNCRFLQGRGTDRAVQLIRDAVKEQRDVTQVLNYT
appy1	- - - - -
cphy2	- - - - -
mcphy1	- - - - -
mpphy1	- - - - -
msphy1	- - - - -
paphy1	- - - - -
pphy0	- - - - -
pphy1	- - - - -
pphy2	- - - - -
pphy3	- - - - -
pphy4	- - - - -
psphy1	- - - - -
smpphy1	- - - - -
aphA	- - - - -
cph1	- - - - -
cwCph1	- - - - -
npCph1	- - - - -
cwCph1a	- - - - -
npCph1a	- - - - -
toCphA	- - - - -
aphB	- - - - -
atBphP1	- - - - -
atBphP3	- - - - -
avAphB	- - - - -
chBphP1	- - - - -
chBphP2	- - - - -
drbphp	- - - - -
goBphP	- - - - -
krBphP	- - - - -
mmBphP2	- - - - -
paBphP	- - - - -
pfBphP	- - - - -
ppBphP1	- - - - -
ppBphP2	- - - - -
ppkBphP2	- - - - -
psBphP1	- - - - -
psBphP2	- - - - -
pssBphP1	- - - - -
pssBphP2	- - - - -
pstBphP1	- - - - -
rcPpr	- - - - -
rlBphP	- - - - -
atBphP2	- - - - -
brBphP	- - - - -
rpBphP1N	- - - - -
rpBphP2N	- - - - -
rpBphP3N	- - - - -
rpBphP4N	- - - - -
rpBphP5N	- - - - -
rpBphP6N	- - - - -
rrBphP	- - - - -
rsBphP1	LGGGHTAAQDHRRFFAAVTGLVHAADLKVVQEGIETLDQLALVRAAGADFAQGFHLAAPLS
rsBphP1a	LGGGHTAAQDHRRFFAAVTGLVHAADLKVVQEGIETLDQLALVRAAGADFAQGFHLAAPLS
toCphB	- - - - -
xaBphP	- - - - -
xcBphP	- - - - -
anFPH1	- - - - -
bfFPH2	- - - - -
chFPH1	- - - - -
cnFPH1	- - - - -
gmFPH1	- - - - -
gzFPH1	- - - - -
ncFPH1	- - - - -
ncFPH2	- - - - -

Rockwell, Su, and Lagarias Supplemental Figure 1

Rockwell, Su, and Lagarias Supplemental Figure 1

smphy1	-----KMLVGEIFGIQMMYCRKGQDAVTKFMIVLNSAADGQDT-EKFPFAFFDRQGK
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----ESVRAPLPPGAVALLMYTGLVERRDAGLEETTGVL AETA-TRAADLLPRSRG
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	IAAAALGLIAASRKE-----
rsBphP1a	IAAAALGLIAASRKE-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----NQTQQQAQKLTQALHHLQQTQTQLIQTEK
cph2	FLTRPLPAEAMMTYLYYQPQILDGFPTPPLPKVALPETETEAGQGNVGDRPLPNLSLNRENP
npCph2a1	SAPRHWEASEIKFITQIANQLGVALQQAQLHNQTKEQTEKLTQALHDLKQTQTQLIQTEK
npCph2a2	QKSREWQDSEIEFVRQIAAQLGVALQHVVLLNQTQQQAIQLAQALEHLQQTQAHLLHSEK
npCph2b	-----TEARNKAGELGQTLHKLQETQTRLIQTEK
aphyA	YIE-----CLLCVSKKLREGV-----
asphyA3	YIE-----CLLSANRKENEGL-----
asphyA4	YIE-----CLLSANRKENEGL-----
atphyA	YVE-----CLLCVSKKLDRKGV-----
cphyA	YVE-----CLLCVNKILDKDGA-----
cupphyA	YVE-----CLLSVTKRLNQDGA-----
gmpphyA	YVE-----CLLSVSKKLDVEGL-----
lephyA	YVE-----CLLCVSKRLDKEGA-----
lphyA	YVE-----CLLSVSKKIDAEGL-----
mgphyA	YVE-----CILCASKKIDGEGA-----
ntphyA	YVE-----CLLCVSKRLDREGA-----
omphyA	YVA-----CLLCVSKKVDSSEG-----

Rockwell, Su, and Lagarias Supplemental Figure 1

osphya	YIE-----	CLLSVNRKVNAADGV-----
pcphya	YVE-----	CLLCASKKLHGEGT-----
psphya	YVE-----	CLLSVSKKIDAEGL-----
sbphya	YIE-----	CLLSVNRKVNAADGV-----
slphya1	YIE-----	CLLCVNKKLNGEGD-----
slphya3	YIE-----	CLLCVNKKLDGDGA-----
slphya4	YIE-----	CLLCVNKKLDGDGA-----
stphya	YVE-----	CLLCVSKRLDKEGA-----
taphya	YTE-----	CLLSVNRRQNEGGL-----
zmphya1	YIE-----	CLLSVNRKVNAADGV-----
atphyb	FVQ-----	ALLTANKRVSLE GK-----
atphyd	FIQ-----	ALLTLNKRVSIDGK-----
gmphyb	YVQ-----	TFLTANKRVRVNMEGQ-----
lephb1	YVQ-----	ALLTANKRVRVNMEGD-----
lephb2	FVQ-----	ALLTANKRVRVNVDGQ-----
npphyB	YVQ-----	ALLTANKRVRVNMEGQ-----
ntpphyb	YVQ-----	ALLTANKRVRVNMEGQ-----
osphyb	YVQ-----	ALLTANTRSRMDGE-----
pbphyb1	YVQ-----	ALLTANKRVRVNMEGE-----
pbphyb2	NVQ-----	TLLTANKRVRVNMEGD-----
sbphyB	YVQ-----	ALLTANTRSKMDGK-----
slphyb	YVQ-----	GLLTANKRTNIDGH-----
stphyb1	YVQ-----	ALLTRNKRVNMEGD-----
stphyb2	YVQ-----	ALLTANKRVRVNMEGD-----
zmphyb1	YVQ-----	ALLTANTRSKMDGK-----
zmphyb2	YVQ-----	ALLTANTRSKMDGK-----
atphyc	FIE-----	ALLSANKRTDIEGK-----
osphyc	YIE-----	SMTATKRTDAEGK-----
sbphyc	YIE-----	SLLTVNKRINAEGK-----
slphyc	CID-----	ALLCATPRFNADR N-----
taphyc	YME-----	SLLTANKRTDAEGK-----
zmphyc1	YIE-----	SLLTVNKRTDAEGK-----
zmphyc2	YIE-----	SLLTVNKRTNAEGK-----
lephye	FLE-----	VFLTANKRTDEHGN-----
atphye	YIE-----	ASLTANKSTNIEGK-----
inphye	FID-----	VFITANKRTDERGN-----
lephyf	YIE-----	ALISANKKVDDDGR-----
acvphy1	RVE-----	ALLIASKRTDADGR-----
acvphy2	YAE-----	ALLIANKRTDS DGA-----
acvphy3	RATAQRVDAARELPDANLVPDHLFAPHSKVVTPLPHSKTNSSSWFAIRRVQRLRRGER	
appy1	YVE-----	ALLTANKRTVGDA-----
cphy2	FVE-----	ALLSTNKRTNADGV-----
mphy1	CVD-----	SLLSTNKRTDADGA-----
mpphy1	FVE-----	ALLTANKRTDSEGA-----
msphy1	IVE-----	VLLTTSKRCNSEGV-----
paphy1	NTE-----	ALLSANKRTDAEGI-----
pphy0	YVD-----	VLLSTNKRTNADGV-----
pphy1	YVD-----	VLLSTNKRTNADGV-----
pphy2	YVD-----	PLLTVNKR TDAE GS-----
pphy3	YVD-----	ALLSTNKRTNADGA-----
pphy4	YVD-----	ALLTVNKRTDAEGS-----
psphy1	YVE-----	ALLTANKRTDADGR-----
smphy1	YVE-----	ALLTATKRADAEGS-----
aphA	-----	-----
cph1	-----	-----
cwCph1	-----	-----
npCph1	-----	-----
cwCph1a	-----	-----
npCph1a	-----	-----
toCphA	-----	-----
aphB	-----	-----
atBphP1	-----	-----
atBphP3	-----	-----
avAphB	-----	-----
chBphP1	-----	-----
chBphP2	-----	-----
drbphp	-----	-----
goBphP	-----	-----
krBphP	GMA-----	AVADRLLTAVPGDAGDDTTVLVRPAHPA
mmBphP2	-----	-----
paBphP	-----	-----
pfBphP	-----	-----

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ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	----- ELGLSRSKD--VAKTLQEEKRRR---
rpBphP5N	-----
rpBphP6N	-----
rrBphP	----- RGQLLGFRGTGTDVTPFKRLQEERVRTQR-
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	MSSLG
cph2	WTE---KLHDYVLLKERLQQRNVK--EKLVLKIANKIRASLNINDILYST
npCph2a1	MSSLG
npCph2a2	MSSLG
npCph2b	MSGLG
arphyA	----- VTGVFCFLQLASHELQQALHVQRLAERTALKRLKTLAY
asphyA3	----- ITGVFCFIHVVASHELQHALVQQASEQTSLKRLKAFTSY
asphyA4	----- ITGVFCFIHVVASHELQHALVQQASEQTSLKRLKAFTSY
atphyA	----- VTGVFCFLQLASHELQQALHVQRLAERTAVKRLKALAY
cphyA	----- VTGFFCFLQLPSHELQQALNIQRLCEQTALKRLRALGY
cupphyA	----- VIGLFCFLQLASQELQQALHFQKLSEQTATKRLKVLAY
gmpphyA	----- VTGVFCFLQLASPELQQALHIQRLSEQTAKRLNALSY
lephyA	----- VTGLFCFLQLASHELQQALYVORLSEQTALKRLKVLAY
lspphyA	----- VTGVFCFLQLASPELQQALHIQRLSEQTALKRLKVLTY
mgphyA	----- VTGVFCFLQLASPELQQALHVQRLTEQTALKRFKELAY
ntphyA	----- VTGLFCFLQLASHELQQALHIQRLSEQTALKRLKVLAY
omphyA	----- VTGLFCFLQLASPELQQALHIQRISEQTASKRLRVLAY
osphyA	----- ITGVFCFIQVPSHELQHALHVQQASQQNALTKLKAYSY
pcphyA	----- VTGIFCFLQLASQELQQALHIQRLTEQTAMKRLKTLSY
psphyA	----- VTGVFCFLQLASPELQQALHIQRLSEQTALKRLKVLTY
sbphyA	----- VTGVFCFIHVPSDDLQHALHVQQASEQTAAQRRLKAFTSY
slphyA1	----- VTGVFCFLQLASHDLQHALHIQRLAEQAATKRANVLAY
slphyA3	----- VTGVFCFLQLASHDLQHALHIQRLAEQAATKRAKALAY
slphyA4	----- VTGVFCFLQLASHDLQHALHIQRLAEQAATKRAKALAY
stphyA	----- VTGLFCFLQLASHELQQALHVQRLSEQTALKRLKVLAY
taphyA	----- ITGVFCFIHIPSHELQQALVQQASEQKSLKRLKAFTSY
zmphyA1	----- VTGVFCFIHVPSDDLQHALHVQQASEQTALRRLKAFTSY
atphyB	----- VIGACFCFLQJPSPELQQALAVQRRQDTECTKAKELAY
atphyD	----- IIGACFCFLQJPSPELQQALEVQRRQSEYFSRRKELAY
gmpphyB	----- IIGACFCFLQIMSPPELQQALKAQQRQEKEFLGRMKELAY
lephb1	----- TIGACFCFIQIASPELQQALRVQRQQEKKCYSQMKELAY
lephb2	----- IIGACFCFLQIASPELKTL-MQRQQEKTSNIHMKELAY
npphyB	----- IIGACFCFIQIASPELQQALRVQRQQDKKCYSQMKELAY
ntpphyB	----- IIGACFCFIQIASPELQQALRVQRQQEKKCYSQMKELAY
osphyB	----- AIGACFCFLQIASPELQQAFEIQRHHEKKCYARMKELAY
pphyb1	----- IVGACFCFLQIASNELQQALKVQRQQEKKSARMKELAY
pphyb2	----- IIGACFCFLQIASPELQQTLKVQKQQEKKSARMKELAY

Rockwell, Su, and Lagarias Supplemental Figure 1

sbphyB	SIGAFCFLQIASEIQQAFEIQRQQEKKYARMKELAY
s1phyb	-ITGAFCFLOIASSDLQQALEIQRQQENVCFERMKELAY
stphyb1	-TIGAFCFIQIASPELQQALRVQRQQEKKCYSQMKELAY
stphyb2	-TIGAFCFIQIASPELQQALRVQRQQEKKCYSQMKELAY
zmphyb1	-SIGAFCFLQIASTEIQQAFEIQRQQEKKCYSQMKELAY
zmphyb2	-SIGAFCFLQIASEIQQAFEIQRQQEKKCYSQMKELAY
atphyC	-VTGVLCFLQVPSPELQYALQQISEHAIACALNKLAY
ospphyC	-ITGALCFLHVVASPELQHALQQVQKMSEQAAMNSFKELEY
sbphyC	-ITGAICFLHVVASPELQHALQQVQKMSEQAATNSFKELEY
slphyC	-ITGVLCFLHLPSPELQYSIHMQKVSEKAATSTLKKLTY
taphyc	-ITGALCFLHVVASPELQHALQQVQKMSEQAATHSFKELEY
zmphyC1	-ITGALCFLHVVASPELQHALQQVQKMSEQAATNSFKELEY
zmphyC2	-ITGALCFLHVVASPELQHALQQVQKMSEQAATNSFKELEY
lephyE	-VCGCFCFLQPMTIDPEASDER--QDSKDSLWKYKEYVY
atphyE	-VIRCCFFLQIINKE---SGLSCPELKESAQSLNELTY
inphyE	-IIGCFCFLQTMADVDPQISARDIEDDRECLSTLKEFAY
lephyf	-VTGVLCFLHVPSPELQYAMHVQKLSEQAAKNSLKKLAY
acvphy1	-ITGVFCFLHTASPELQQALQVQKRSARTALDRLEKAVY
acvphy2	-ITGVFCFLHTASPELQQALQVQKRSARTALDRLEKAVY
acvphy3	LGLKHFRPIKPLGGDTGSVHLVELRGTGQVFAKAMDKSMLQRNKVHRARAERILAI
appy1	-ITGVFCFLYTASPELQQALQVQKRSARTALERLKEAVY
cphy2	-ITGVFCFLQIASSELQQALTVQRATEKVAIAKLKELAY
mphy1	-ITGVFCFLHTVSLELQQALSVQKAAERVAEAKAKELAY
mphy1	-FTGVFCFLQIASMELLQQALTVQRATEKVAFSKLKELAY
msphy1	-VTGVFCFLHTASSELQQALTVQKAAERVAEVAKAKELAY
paphy1	-ITGVFCFLHTVSTELQQALQVQRMAEQAAMDRLEKAY
pphy0	-ITGVFCFLQIASSELQQALKVQRATEKVAVALKELAY
pphy1	-ITGVFCFLQIASSELQQALKVQRATEKVAVALKELAY
pphy2	-ITGVFCFLHTTSVELLQALTVQRSTEKVAFAKLKELAY
pphy3	-ITGVICFLQIASSELQQALRVQQATEKVAIAKLKELAY
pphy4	-ITGVFCFLHTTSVELLQALTVQRATEKVAFAKLKELAY
psphy1	-ITGSFCFFRIASSELQHALLEVQRQQEKKCFCARLKELAY
smphy1	-ITGVFCFLHIASAELQQALTVQRATEKVALSKLKELAY
aphA	--KKFAYVASHDLQEPLNQVAN-----
cph1	--KKFAYTASHDLQEPLNQVSN-----
cwCph1	--KKFAYVASHDLQEPLNQVSN-----
npCph1	--KKFAYVASHDLQEPLNQVNN-----
cwCph1a	--
npCph1a	--ASFAYAASHDLKEPLRGIYN-----
toCphA	--KKFAYVASHDLQEPLNQVAN-----
aphB	--DAFAYTASHDLKEPLRGIHN-----
atBphP1	--EAFSYSVSHDLRAPFRHIVG-----
atBphP3	--EAFSYSVSHDLRAPFRHIVG-----
avAphB	--DAFAYTASHDLKEPLRGIHN-----
chBphP1	--ENINWISTHDLQEPLRKIQI-----
chBphP2	--
drBphP	--RQYGFVISHHMQEPVRLISQ-----
goBphP	--DFLIREVNHRVQNSLQMVAS-----
KrBphP	AEPAARTEG-----
mmBphP2	--
paBphP	--QRЛИAVLGHDLRNPLQS-----
pfBphP	--DELVAVVSHDLRNPMVTISM-----
ppBphP1	--RMLNEELNHRVKNIISLIGA-----
ppBphP2	--EAFSYSVSHDLRAPLRHIAG-----
ppkBphP2	--EAFSYSVSHDLRAPLRHIAG-----
psBphP1	--DELVAVVSHDLRNPMVTISM-----
psBphP2	--DELVAVVSHDLRNPMSSIIM-----
pssBphP1	--DELVAVVSHDLRNPMVTISM-----
pssBphP2	--DELVAVVSHDLRNPMSSIIM-----
pstBphP1	--DELVAVVSHDLRNPMVTISM-----
rcPpr	--SRFLANMSHELRTPLNAIIG-----
rlBphP	--ELLIAEELNHRVRNILSLITG-----
atBphP2	--RMLNEELNHRVKNVLAIKS-----
brBphP	--
rpBphP1N	--
rpBphP2N	--ESFAHVASHDIKEPLRHIEA-----
rpBphP3N	--ESFAYVAAHDLKEPLRHIEA-----
rpBphP4N	--VLVEADLSKVLRRRTVEDQEA-----
rpBphP5N	--SRYTDVASAELKEHLRGIIHH-----
rpBphP6N	--RVLNEELNHRVKNIALIKS-----
rrBphP	--LEALGRLAGGIAHEIGNVLQPVLT-----
rsBphP1	--

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rsBphP1a	-----
toCphB	-----DAFAYIASHDLKEPLRGITH-----
xaBphP	-----
xcBphP	-----
anFPH1	-----KLLLANSASAHEVRTPLNAIVN-----
bfFPH2	-----RLLLKNNTSHEVRTPLNAVNV-----
chFPH1	-----RLLLANSASAHEVRTPLNAIIN-----
cnFPH1	-----AIIISNTSHAVRTPLPSQIIN-----
gmFPH1	-----RLLLANSASAHEVRTPLNAIIN-----
gzFPH1	-----RLLLANSASAHEVRTPLNAIIN-----
ncFPH1	-----RLLLANSASAHEVRTPLNAIIN-----
ncFPH2	-----RLLLHDASHQVRNPLNAVIN-----
umFPH1	-----RLLLSNASHEVRTPLNHIIN-----
aphC	-----QLVAGVAHEINNPVNFIYGNLSHVSEYAQNLLT
cph2	-----VTEVRQFLNTRDVLFKFNSQWSGQVVTESHNDFCRSI
npCph2a1	-----QLVAGVAHEINNPVNFIYGNINHVNYYAQDLLG
npCph2a2	-----LLVAGVAHEINNPVNFIISGNLSHLHEYTQSLIK
npCph2b	-----QLVAGIAHEINNPVNFIYGNLCHASDYIEQLLE
arphyA	IKRQIRN-----PLSGIMFTRKMMEGTELGPSEQ-RQILQTSSLCKQQLSKVLDSS
asphyA3	MRHAINN-----PLSGMLYSRKALKNTDLNEEQ-MKQIHVGDNCHHQINKILADL
asphyA4	MRHAINN-----PLSGMLYSRKALKNTDLNEEQ-MKQIHVGDNCHHQINKILADL
atphyA	IKRQIRN-----PLSGIMFTRKMIEGTLEGPEQ-RRIIQTSAQCQKQLSKILDSS
cphyA	IKRQIQN-----PLSGIIFSRRLLERTELGVSEQ-KELLRTSGLCQKQISKVLDSS
cupphyA	LRKQVKN-----PLSGIMFSRKMLEGTELGNNDQ-QNILHTSAQCQQQLSKVLDST
gmpphyA	MKRQIRN-----PLCGIVFSRKMLEGTDLGEQ-KQLLRTSAQCQQQLSKILDSS
lephyA	IRRQIRN-----PLSGIIFSRRKMLEGTLGEEQ-KNILHTSAQCQRQLNKILDST
lsphyA	MKRQIRN-----PLAGIVFSSKMLEGTDLETEQ-KQIVNTSSQCQRQLSKILDSS
mgphyA	IRRQTRA-----SLSGIMYSWRMLEGTLRERQ-KQLLHTSAQCQHQQLTKILDST
ntphyA	IRRQIRN-----PLSGIIFSRRKMLEGTLNDEQ-KNIRLRTSSQCQRQLNKILDST
omphyA	IRREIRS-----PLSGIIFSRRKMLEGTDLNDEQ-KNIVRTSLHCQSQMNKILEDT
osphyA	MRHAINN-----PLSGMLYSRKALKNTGLNEEQ-MKEVNVADSCHRQLNKILSDL
pcphyA	LRRQAKN-----PLCGINFVREKLEEIGMEEQ-TKLFRTSVHCQRHVNKILDST
psphyA	MKRQIRN-----PLAGIVFSSKMLEGTDLETEQ-KRIVNTSSQCQRQLSKILDSS
sbphyA	MRHAINK-----PLSGMLYSRETLKSTGLNEEQ-MRQVHVADSCHRQLNKILADL
slphyA1	MKRQIKN-----PLAGIIFSGKILDGTVDEQ-KRLVQTSARCGQLNKILDSS
slphyA3	MKRQIKN-----PLSGIMFSKGKILDGTEMGEDQ-RQVLQTSIRCQGQLNKILDSS
slphyA4	MKRQIKN-----PLSGIMFSKGKILDGTEMGEDQ-RQVLQTSIRCQGQLNKILDSS
stphyA	IRRQIRN-----PLSGIIFSRRKMLEGTLGEEQ-KNILHTSAQCQRQLDKILDST
taphyA	MRHAINN-----PLSGMLYSRKALKNTDLNEEQ-MRQIHVADNCCHQQLNKILADL
zmphyA1	MRHAIDK-----PLSGMLYSRETLKGTDLDEEQ-MRQVRVADNCCHRQLNKILADL
atphyB	ICQVIKN-----PLSGMRFANSLLAEATDLNEDQ-KQLLETSVSCEKQISRIVGDM
atphyd	IFQVIKN-----PLSGLRFNTSLLEDMDLNEDQ-KQLLETSVSCEKQISRIVGDM
gmpphyB	ICQGVVK-----PLSGIRFTNSLLEATSLTNEQ-KQFLETSVACEKQMLKIIRDV
lephb1	ICQEIKS-----PLNGIRFTNSLLEATNLTEYQ-KQYLETSAAKERQMSKIIIRDV
lephb2	ICRELKN-----PLNGIRFTNSLLEATELTENQ-KQFLETSAAKERQMSKIIIRDV
npphyB	LCQEIKS-----PLNGIRFTNSLLEATDLTEDQ-KQYLETSTACERQMSKIIIRDV
ntphyB	LCQEIKS-----PLNGIRFTNSLLEATDLTENQ-KQYLETSAAKERQMSKIIIRDV
osphyB	IYQEIKN-----PLNGIRFTNSLLEMTDLKDDQ-RQFLETSACEKQMSKIVKDA
pphyb1	ICQEIRN-----PLSGLRFNTSLLENTDLTEDQ-KQFLETSAAACEKQILKITRDV
pphyb2	ICQEIKN-----PLSGIHTFTNSLLENTDLTEDQ-QQFLETSAAACEKQILKIIRDV
sbphyB	ICQEIKN-----PLSGIRFTNSLQLQMTDLNDDQ-RQFLETCASCEEQMSKIVKDA
slphyB	LCQEIKN-----PLNGIRFANSLLAEATSLGEDQ-KQFIELTSNACEKQIKKILGDI
stphyb1	ICQEIKS-----PLNGIRFTNSLLEATNLTENQ-KQYLETSAAKERQMSKIIIRDV
stphyb2	ICQEIKS-----PLNGIRFTNSLLEATNLTEQ-KQYLETSAAAKERQMSKIIIRDV
zmphyb1	ICQEIKN-----PLSGIRFTNSLQLQMTDLNDDQ-RQFLETSACEKQMSKIVKDA
zmphyb2	ICQEIKN-----PLSGIRFTNSLQLQMTDLNDDQ-RQFLETSACEKQMSKIVKDA
atphyc	LRHEVKD-----PEKAISFLQDLLHSSGLSEDQ-KRLLRTSVLCREQLAKVISDS
osphyc	IRQELRN-----PLNGMQFTRNLLEPSDLTEEQ-RKLLASNVLQCEQLKKILHDT
sbphyc	IHQELRN-----PLNGMQFTCNLLKPSLTELQQ-RKLLSSNILCQDQLKKILHDT
slphyC	FREQVRS-----PIKGMFTAERNLLESSELNIEQ-KQILTTISLCEQLMKIIEDT
taphyc	IRQELKN-----PLNGMQFTRKLLEPSDLTEEQ-RQLFASNVLCQEQQLKKILHDT
zmphyC1	IRQELRN-----PLNGMQFTCNLLKPSLTELQQ-RQLFASNVLCQEQQLKKILHDT
zmphyC2	IRQELRN-----PLNGMQFTYNLLKPSLTELQQ-RQLVSSNVLCQDQLKKILHDT
lephyE	VLQQMKN-----PLNGIQFTHKLLAEATGVSDNQ-KQLETSEACEKQILSVIDNM
atphyE	VRQEIKN-----PLNGIRFAHKLLESSEISASQ-RQFLETSACEKQITTIEST
inphyE	IQQQMKN-----PLNGIRFTHKLLLEGTVTSRDHQ-KQFLETSEACEKQILSIIENM
lephyf	VRLELKN-----PLNGINCQNLKSSDLSKDQ-RQLLKSTMCKQQLAKIIDT
acvphy1	VKEELKK-----PLEGLAFTRTVLEGTNLTIEQ-RQLIKTNAWCERQLRKILED-
acvphy2	MKQEIRN-----PLYGIVFTRKLLDNTNLTDEQ-KQIMETSSLCEKQLQNLDED
acvphy3	M-----DHPLPTLYASFQTKT-----HVCLITDYPGGDFLLQDKQ

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apphy1 MKQEIRN-----PLGYIIFTRKLMESSNLTAEQ-KQLIETSAVCERQLQKILDED
 cphy2 IRQEIKN-----PLCGITFTTRQLLEDTDLSDDQ-KQFLDTSAVCEQQLQKVLDNM
 mcpphy1 IRQEIQN-----PLDGIFHAFARSFIEHTELSEDQ-KQLMETSATCEKQLRRILDDM
 mpphy1 IRQEIKN-----PLYGIMFTRNLVEDTNTLEEQ-KQFIETSAVCERQLRRILDDM
 msphy1 IRQEIQN-----PLDGIFHAFARSFMEHTVLSEDQ-KQLIETSAVCERQLRRILADM
 paphy1 IRQEIRN-----PLGYIIFTRKLMEESTDLSEEQ-KQIVQTSAVCERQLRKVLDDA
 ppphy0 IVREIKN-----PLCGLTFTTRQLLEDTDLSDDQ-QQFLDTSAVCEQQLQKSLNDM
 ppphy1 IRQEIKN-----PLCGITFTTRQLLEDTDLSDDQ-QQFLDTSAVCEQQLQKVLDNM
 ppphy2 IRQEIKN-----PLYGIVFTRNLMEDTDLSDDQ-QQFLDTSAVCEQQLQKVLDNM
 ppphy3 IRQEIKN-----PLCGITFTTRQLLEDTDLSDDQ-KQFLDTSAVCEQQLQKVLDNM
 ppphy4 IRQEIKN-----PLYGIMFTRNLMEDTDLSEDQ-RQFVETSAVCERQLRKVLDDM
 psphy1 IRQEIKN-----PLYGMMFTRKLLEETDLSDDQ-KQFVETSAVCERQMVKVMDM
 smphy1 IRQEIKN-----PLYGIMFTRTLMETTDLSDDQ-KQYVETGAVCEKQIRKILDDM
 aphA -----YVQLLEMRYQDQLDADANE---FITFAVEGVSLMQTLIDDDVL
 cph1 -----YVQLLEMRYSEALDEDAKD---FIDFAVTGVSLMQTLIDDDVL
 cwCph1 -----YVQLLEMRYDEALDEDGKE---FINFAVEGVSLMQTLIDDDVL
 npCph1 -----YVQLLEMRYSEELDEDAQE---FISYAVQGVSLMQTLIDDDVL
 cwCph1a -----
 npCph1a -----FSTVLLEDYAQVLDLDDGIE---CLQTVVSLSRMELTINALL
 toCphA -----YVQLLEMRYENLDEDAKE---FINFAVEGVSLMQTLIDDDVL
 aphB -----YSNFLMEDYGEIIDAPGK-EKLLTLIRLTQRMEDLIDSLL
 atBphP1 -----FAQLLRER-SDALDEKSLH---YLQMISEAAALGAGRLVDDLL
 atBphP3 -----FAQLLRER-SDALDEKSLH---YLQMISEAAALGAGRLVDDLL
 avAphB -----YSNFLMEDYGEIIDAQGKE---KLLTLIRLTQRMEDLIDSLL
 chBphP1 -----ITSYVLSVENTLSEASYE-KLKINKSANRMQALISDIL
 chBphP2 -----
 drBphP -----FAELLTRQPRAQDGSPDSPQTERITGFLLRETSRLRSLTQDL
 goBphP -----FLKLQARSASNEETTALTEAQHRIAIGLVRRLYRDE
 krBphP -----
 mmBphP2 -----
 paBphP -----ISMAALLSSSDTRTTELR---QHISASSSRMERLVSQIL
 pfBphP -----LCGMMQKAFSSDGPHTSRRISTAITDMQQAAGRMTLLEDLL
 ppBphP1 -----LVAHPTPESQTLQD-----YVATLKG
 ppBphP2 -----YTELLGEIEGQGLSERGKR---FLQHIGEAAHFAGSLVDNLL
 ppkBphP2 -----YTELLGEIEGQGLSERGKR---FLQHIGEAAHFAGSLVDNLL
 psBphP1 -----LCGMMQKSFSDDGPHTSRRIS-RQSTHAASCQPHERVARDLL
 psBphP2 -----QCQMMQRWAVDDTNFENRNIRRALTIEKATTRMNSLLEDLL
 pssBphP1 -----LCGMMQKSFSDDGPHTSRRISTAITDMQQAASRMNVLLLEDLL
 pssBphP2 -----QCQMMQS WAVGDTHFENRNIRRALTIEKATTRMNSLLEDLL
 pstBphP1 -----LCGMMQKSFSDDGPHTSRRISTAITDMQQAASRMNVLLLEDLL
 rcPpr -----FSDLMMMSGMAGTLPPRIQD---YVQSIHASGEHLLRMVVNDVL
 rlBphP -----IIRQSQATSVSLGD-----YIRQLEG
 atBphP2 -----LVGNPSQEGKTLQE-----YVTALKG
 brBphP -----
 rpBphP1N -----
 rpBphP2N -----FAGLLADNIREMGERLGV--MVSGIEKSSRRLRNLINDLA
 rpBphP3N -----FAGLLNDLLPEARSRLSL--MVNGIEASSRRRLRALINDLA
 rpBphP4N -----ERLRIARELHDTLGQS-----LTLLQLGFDKLGQAAG
 rpBphP5N -----LTTSRQQGEVLDEEGRQ-QVATILKLTQRMDALVDAL
 rpBphP6N -----LVNQPAGEGKSLEE-----FASALRG
 rrBphP -----MAHYASKRLDDRFLEA-----ALADICEGGARAKDIVR
 rsBphP1 -----
 rsBphP1a -----
 toCphB -----YSSFLIEDYGNRLDDEGIG---RLRTLIRLTQRMENLIDSLL
 xaBphP -----
 xcBphP -----
 anFPH1 -----YLEIALEGALDGETR----DHLSKSYSASKSLIYVINDLL
 bfFPH2 -----YLEMALEDKIESPTR----ELLEKAHRASRSLSVYVINDLL
 chFPH1 -----YLEIALEGALDQETR----ENLSRSHSASKSLIYVINDLL
 cnFPH1 -----TLELALAGNIDDVR----KMLENSHQASRALLFHVHDLL
 gmFPH1 -----YLEIALEGSLDQETR----ENLARSHSASKSLIYVINDLL
 gzFPH1 -----YLEIALEGSLDQETR----DNLARSHSASKSLIYVINDLL
 ncFPH1 -----YLEIALEGSLDQETR----DNLARSHSASKSLIYVINDLL
 ncFPH2 -----CLEIALEKHLDGDTK---QVLTTSYTASKSLIYVINDLL
 umFPH1 -----YLELALDSKLDEDTR----ENLSKSHASKSLLFVIN DLL
 aphC MLELYQQEL----PNPSVEILEQADEIDLEFLAKLPKTLSMOMQIGVERIRQIVMSLR
 cph2 INDEIDDPCFKGHYRLYREGRRAVSDIEKADLADCHKELLRHYQVANLVPVVFNEN
 npCph2a1 ILDLYLQNT----PNPSPEIRDRTFEIDLEFLIEDLPKTLSMOKIGVDRIRQIVLGLR
 npCph2a2 MLNIYQQIY----PQPHPEIEKQAILSDLEFIAEDLPKLFSSLKIGAERIGEIVLSLR
 npCph2b ILRLYQQLHY----PDPHSEISAIEAVDFEFLVEDLPRIITSMQVGSDRIRSIVLSLR

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arphyA DLERIIEGC--LDLEMKEFSNLNEVLTASTSQVMMKSN---GKSVRITN-----ETGEE
 asphya3 DQDSITEKSSCLDLEMAEFLQLDVVAAVSQVLITCQ---GKGIRISC-----NLPER
 asphya4 DQDSISEKSSCLDLEMAEVFVQDVVAAVSQVLITCQ---GKGIRISC-----NLPER
 atphya DLESIEG--CLDLEMKEFTLNEVLTASTSQVMMKSN---GKSVRITN-----ETGEE
 cpphyt DIDKIIDG--FIDLEMDEFTLHEVLMVSISQVMLKIK---GKGIQIVNE-----TPEE
 cupphyt DLDCIIEG--YLDLEMVEFKLDEVLLASISQVMTKS---GKSLRVIND-----VAEN
 gmphyt DLDTIIDG--YLDLEMAEFTLHEVLVTLSLSQVMEKSN---GKSIRIVND-----VAGH
 lephyt DLDSIIDG--YLDLEMLEFKLHEVLVASSISQVMMKSN---GKNIMISND-----MVED
 lsphyt DLDGIDG--YLDLEMAEFTLHEVLVTLSLSQVMNRSN---TKGIRIAND-----VAEH
 mgphyt DLDCIIDG--YLDLEMVEFTLYEVLSASISQVTLKSN---GKGHIHIANP-----LQEE
 ntphyt DLDSIIDG--YLDLEMLEFKLHEVLVASSISQTMKSN---GKNIMIVND-----MVED
 omphyt DLDHIIEG--YLDLEMVEFKLHEVLIASISQVISKS---GKGKIVDN-----LAPN
 osphyt DQDSVMNKKSSCLDLEMVEFVLDQDFVAAVSQVLITCQ---GKGIRVSCN-----LPER
 pcpphyt DLDSIIDG--YLDLEMSEFRLHDVVVASRSQSVMRSN---GKAIQVVDN-----FSEE
 pspphyt DLDGIDG--YLDLEMAEFTLHEVLVTLSLSQVMNRSN---TKGIRIAND-----VAEH
 sbphyt DQDNITDKSSCLDLMMAEFVLEDVVVSASVSQLIGCQ---GKGIRVACN-----LPER
 slphyt DLDSIIDG--YCELEMVEFAVQDILVASSISQVMAKSS---EKGIQMSNN-----CTEH
 slphyt DLDSIIDG--YCELEMVEFTVQDILVASTCQVMAKSN---EKGIQIANDS-----TTEH
 slphyt DLDSIIDG--YCELEMVEFTVQDILVASSISQVMAKSS---EKGIQMSNN-----CTEH
 stphyt DLDSIIEG--YLDLEMLEFKLHEVLVASSISQVMMKSN---GKNIMISND-----MVED
 taphya DQHNIMEKSSCLDLEMAEFVLDQDVVAAVSQVLIACQ---GKGIRVSCN-----LPER
 zmpphyt DLQDNITDKSSCLDLMMAEFVLDQDVVAAVSQVLIACQ---GKGIRVACN-----LPER
 atphyb DLESIEDG--SFVLKREEFFLGSVINAINVSQAMFLLR---DRGLQLIR-----DIPPE
 atphyd DVKSIDDG--SFLERTEEFFIGNVTNAVVSQVMLVVR---ERNLQLIR-----NIPTE
 gmphyb DLESIEDG--SLELEKGEFLLGNVNINAVVSQVILLLR---ERNLQLIRD-----IPPE
 lephb1 DLENIEDG--SLTLEKEDEFFLGSVIDAVVSQVMLLLR---EKGVQLIRD-----IPPE
 lephb2 DLDNIEDG--SLELEKGEFFLGSVIDAVVSQVMLLLR---ERGVQLIRD-----IPDE
 npphyB DLENIEDG--SLTLDEKEFFLGSVIDAVVSQVMLLLR---ERSVQLIRD-----IPPE
 ntphyb DLENIEDG--SLTLEKEEFFLGSVIDAVVSQVMLLLR---ERSVQLIRD-----IPPE
 osphyb SLQSIEDG--SLVLEKGEFSLGSVMNAVVSQVMIQLR---ERDLQLIRD-----IPDE
 pbphyb1 DLESIENG--LLELEKAELFLGSVINAVVSQAMLLLR---ERNLQLLRD-----IPPE
 pbphyb2 DLESIENG--SLELEKAELFLGSVINAVVSQAMLLLR---ERNLQLLRD-----IPPE
 sbphyB TLQSIEDG--SLVLEKSEFSFGDVMNAVVSQAMLLLR---ERDLQLIRD-----IPDE
 slphyb HLESVDES--PFELVKTEFMLGNIIINAVVSQVMIPLR---ERELQLIRD-----IPPE
 stphyb1 DLENIEDG--SLTLEKEDEFFLGSVIDAVVSQVMLLLR---EKGVQLIRD-----IPPE
 stphyb2 DLENIEDG--SLTLEKEDEFFLGSVIDAVVSQVMLLLR---EKGVQLIRD-----IPPE
 zmpphyt1 SLQSIEDG--SLVLEQSEFSLGDMNAVVSQAMLLLR---ERDLQLIRD-----IPDE
 zmpphyt2 SLKSIEDG--SLVLEKSEFSLGDMNAVVSQTMSSLR---ERDLQLIRD-----IPDE
 atphyc DIEGIEEG--YVELDCSEFGLQESLEAVVKQVMELSI---ERKVQISC-----DYPQE
 osphyc DLESIEQC--YTEMSTVDFNLEEAALNTVLMQMAMPQSK---EKQISIDRD-----WPAE
 sbphyc DLESIEQC--YMEMMTVEFNLEEAALNTVLMQGIPLGK---EKRISIERD-----WPVE
 slphyc DIPSIEEG--YLETSSDDFNLEALDAVVSQVMPLSQ---ESQVHIKHD-----FPSD
 taphyc DLEGIEQC--YMEMMTVEFNLEEAALNTVLMQGMSVSK---EKQISLDRD-----WPVE
 zmpphyt1 DLESIEQC--YMEMNTVEFNLEEAALNTVLMQGIPLGK---EKQISIERN-----WPVE
 zmpphyt2 DLESIEQC--YMETNTVEFNLEEAALNTVLMQGIPLGK---EKRISIERD-----WPVE
 lephyt DFGGIEDG--KVQLNMEEFVLGNVVDAIVSQVMIPLK---EKNLQLLHD-----IPDQ
 atphyt DLKSIEEG--KLQLETEEFRLLENILDTIISQVMIILR---ERNSQLRV-----EVAEE
 inphyt DSGGIVDG--NRVELKTEEFVIGNVIDAVVSQVMIPLK---EKNLQLLHD-----IPDQ
 lephyf DIESIEEC--YTEMNSCEFNLGEVTVVINVQVMLSQ---ERKVQVTWD-----SPVE
 acvphy1 DLNNIEEG--YMDLEMSEFFMGVIDAVISQGMAASR---GKGVQILTD-----IPND
 acvphy2 NFEKLDQG--NVLDLTLLEFTMGTVMDAVISQGMIRSR---EKGQLQIRE-----THVE
 acvphy3 PTQTLERTASFYAAEVVVALEYLHCMGVYIRDLPKENVLLQKGHILLTDFDLSFLTSC
 apphy1 NFEKLDQGN--IDLETVEFSMGTVMDAVISQGMIRSR---EKGQLQVR-----ETNIE
 cpphy2 DLESIEDG--YLELDTAEFEFMGTVMDAVISQGMITSR---EKGQLQIRE-----TPRE
 mcpphy1 DLESIEEG--YLELETGEFMATVMNSVVSQGMVQSS---KKGLQLFC-----TPPE
 mpphy1 DLESIEDG--YLELDTAEFIGMTVMDAVISQGMITSR---EKGQLQIWD-----TPRD
 msphy1 DLASIEKG--YLELETGEFSMATVMNSVVSQGMIQST---QKNLQLYCD-----TPPD
 paphy1 DLESIEDG--YLELDTIEFTLGTLDVAVVSQGMILSR---EKGQLQIRD-----SPEE
 ppphy0 DLESIEDG--YLELDTAEFEFMGTVMNAVISQGMITSR---EKGQLQIFRE-----TPRE
 ppphy1 DLESIEDG--YLELDTAEFEFMGTVMNAVISQGMITSR---EKGQLQIFRE-----TPRE
 ppphy2 DLESIEDG--YLELDTTEFEFMGTVMDAVVSQGMITSR---EKGQLQIRE-----TPSE
 ppphy3 DLESIEDG--YLELDTAEFEFMRTVMDAVISQGMITSR---EKGQLQIRE-----TPRE
 ppphy4 DLESIEDG--YLELDTNEFVMGTVMDAVVSQGMITSR---EKGQLQIRE-----TPRE
 psphy1 DLESLEDG--YMELTDAEFIGTVIDAVVSQGMIVLR---EKGQLQIRE-----IPGE
 smphy1 DLESIEDG--YLELDTTEFMMGTVMDAVVISQGMITSR---EKNLQLIRE-----TPKE
 aphA AYSKVDTQ---AIAFQLTEVEKALDKALGNLRQRIA---ETGANITH-----
 cph1 TYAKVDTQ---YAQLTFTDVQEVDKALANLKRIE---ESGAEIEV-----
 cwCph1 AYSKVDIR---DIKFDLTESENALKAIANLRGRI---AETNAIIT-----H
 npCph1 AYSKVDMQ---AIAFQMNDVETALMRGLGNLRQRIN---ETGATI-----TH
 cwCph1a RLSQLGQA---HLREQATDNLNLLNQVIDVFRASRQ---DSGLVD-----IRIP
 npCph1a AYSKVDMQ---ASAFQLTEVETPLNRSLSNLRGRIH---ETGAMITH-----
 toCphA

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aphB	HFSRLGRV---DLSMQDTDLNEIVHRIILDMLSGRIE---ETGVEIRI-----L
atBphP1	NFSQLGRT---QLTLKPVDMQKVSEVRSLSHAVS---DRQIEWRI-----
atBphP3	NFSQLGRT---QLTLKPVDMQKVSEVRSLSHAVS---DRQIEWRI-----
avAphB	HFSRLGRV---DLSMQDTDLNEIVHRIILDMLSGRIE---ETGVEIRI-----V
chBphP1	RYTKLKAS---TEILESVDLKNIVTEVIQEVDALLE---AKKANIYI-----
chBphP2	-----
drBphP	HTYTALLS--APPPVRRPTPLGRVVDDVLQDLEPRIA---DTGASIEV-----A
goBphP	HFGIVDLG-----RYLEELMELCS---SLGGDWQEQL---HLSL
krBphP	-----
mmBphP2	-----
paBphP	DMSRLQSG-IGLTVNPVDTDVSQQLVRQIVCETDVAYP---GLVIEIAID-----
pfBphP	DTSKIDAG--RYTIAPQKLDVAQMFEAQSSLALP----DKDISISFE-----A
ppBphP1	RIQALSLA--HDQVVRGDGGGLAKLLEAEELSPYRTA---ADVIEL-----QG
ppBphP2	NFSQMGRS---ALRLSDVDSLNALVEAIRSELADPYE---GRAIVW-----DI
pkBphP2	NFSQMGRS---ALRLSDVDSLNALVEAIRSELADPYE---GRAIVW-----DI
psBphP1	DTSKIEAG--RTPSRRSRWKSAKSRSKPIRCSPRWRM---DKSIEISFN-----A
psBphP2	DTAQIEAG--RYQLSLRSLALSVTSLLLEEACSLVMLTT---EKNIELNCT-----S
pssBphP1	DTSKIEAG--RYTITPQPLEVSQIFEEAYTLLAPLAM---DKSIEISFN-----A
pssBphP2	DTAQIEAG--RYQLSLRPLSVTSLLLEEACSLVMLTT---EKNIELNCT-----A
pstBphP1	DTSKIEAG--RYTITPQPLEVSQIFEEAYTLLAPLAM---DKSIEISFN-----A
rcPpr	DLSRIEAG--RMELSPESLDAGILAAECVGMLLPRAV---RGEVLLEVQ-----A
r1BphP	RIQSLARA--HDQITRDHWAPASLRQLLLAETAAYLG---KNAQRQMG-----G
atBphP2	RIQALSFA--HDQIIRGEGGGALRDLLEAEELSPHRSP---ETTVKLEG-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	EFSQLGRR---SKPLSWVSLETVLNEVLADLQPRIT---EARAEIQ-----A
rpBphP3N	EYSRIGRQ---ARPLQPVDLNQILTEVLSLDLKPMLQ---DARADEV-----S
rpBphP4N	DNPELQ---QRIAEMKSLTADVGRQANRLWEI---RPTALDDLGI---QTAI
rpBphP5N	LDRSRGGS---EAASETVDEAVVDDALAPFARRIA---EDRIEVR-----RP
rpBphP6N	RIMALSFA--HDQVVRSDGG--GALLDLIQAELSPYP---ASQITLE-----G
rrBphP	SVLTF---RQTPAERRPLVAPALARSAFAA---KGHPGLEII-----TDIP
rsBphP1	-----
rsBphP1a	-----
toCphB	HFSRLGRV---ELGIQPTDLNDLVQRVIDVLSARIQ---ETGATIRIP-----
xaBphP	-----
xcBphP	-----
anFPN1	DLTNVEKGQ---SLIKDEPFDLPTTFSEATAMFESEAK---RKGLNYKV---LSQP
bFPN2	KLTKAETG--PVTSVKDVFDSLATVSEVMSAFQKEAV---RKNLDLTV-----TIQQ
chFPN1	DLTKTEEG--GPLIKGELFDLKDTIREATDMFRNDAK---RKNIEYQI-----IQHP
cnFPN1	DLTRIETG--NETAFNDPFDIIRQSISDAVRLYQTEVA---RRGLEFRV---NMAE
gmFPN1	DLTKTEEG--QNLVKDEVFDLASCIREATGPFLNDAK---RKGIHYTV-----VQHP
gzFPN1	DLTKTEEG--QNLVKDEVFDLASCIREATGPFLNDAK---RKGIHYTI-----VQHP
ncFPN1	DLTKTEEGK--DLVKDEVFDLLACIREATEPFRHDAK---RKGITYEV-----IEHP
ncFPN2	SLTGSITG--SVPLLDEPFHLPNCLEEVLCPLRRLGQ---EKGIQLIM-----IPST
umFPN1	DLTKQEIGNE--LFLQEPFDLAATVREAVEMHEWEAK---RRKIDFSVTT-----N
aphC	TFSRLDEA---EMKAVNIHEGIDSTLLILQHRLKAK---PETAGIKL-----TKKY
cph2	LWGLLIAHECKTPRYWQEEQEDLQLLMELATQVAIAHQ---GELYEQLETANIRLQQISS
npCph2a1	NFSRLDEA---EMKPVDIHEGIDSTLLILQHRLK---AKPESPAIKL-----VKEY
npCph2a2	NFSRLDQA---QVKPVDIHEGLDSTLLILQHRLK---ANSLHLGIEI-----VKQY
npCph2b	NFSRLDEA---ENKRVDLHEGIDNTLLILQHQLK---GNGKFPQIQC-----IKDY
aphyA	VMSDTLYGDSIRLQQVLADFMLMSVNFTPS---GGQLTVTASLRKDQLGRSV-----
asphyA3	FMKQSVYGDGVRLQQILSDFLFISVKFSPV---GGSVEISSKLTNSIGENL-----
asphyA4	FMKQSVYGDGVRLQQILSDFLFISVKFSPV---GGSVEISSKLTNSIGENL-----
atphyA	VMSDTLYGDSIRLQQVLADFMLMAVNFTPS---GGQLTVTASLRKDQLGRSV-----
cphyA	AMSETLYGDSLRQQVLADFLISVSYAPS---GGQLTISTDVTKNQLGKSV-----
cupphyA	VLCETLYGDSLRQQVLAEFLSVAVNFTPS---GGQLAVSSSLTKDHLGQSV-----
gmphyA	IMMETLYGDSLRQQVLADFLISINFTP---GGQVVVAGSLTKEQLGKSV-----
lephyA	LLNETLYGDSPLRQQVLANFLLCVNSTPS---GGQLSISGRLTKDRIGESV-----
lsphyA	IAKESLYGDSLRQQVLADFLISINSTPN---GGQVVIASSLTKEQLGKSV-----
mgphyA	KMPATLYGDNLRLQQVIADFLSISVNFTPN---GGQIVASASLTKDRLGQSV-----
ntphyA	LLNETLYGDSPLRQQVLANFLLCVNSTPS---GGQLSISGTLTKDRIGESV-----
omphyA	LSNETLYGDSLRQQVLAAFLLIADVSTPS---GGQLGVAATLAKDSIGEFV-----
osphyA	YMKQTQYGDGVRLQQILSDFLFVSVKFSPV---GGSVEISCSLTNSIGENL-----
pcphyA	MMSETLYGDSLRQQVLADFLMSVCVNFTPN---GGHGLGISVTLTEDNLGQSV-----
psphyA	IARETLYGDSLRQQVLADFLISINSTPNNGG---QVVIASLTKEQLGKSV-----
sbphyA	FMKQKVYGDGIRLQQILSDFLFVSVKFSPV---GGSVDISSLKLTNSIGENL-----
slphyA1	GFKETLYGDSLRQQVLADFLSISVNFTSP---GGHIGVTVRLTKDKIGESV-----
slphyA3	GLKETLYGDSLRQQVLADFLSISVNFTPA---GGNVGIVKVRLLTKDKIGESI-----
slphyA4	GFKETLYGDSLRQQVLADFLSISVNFTSP---GGHIGVTVRLTKDKIGESV-----
stphyA	LLNETLYGDSPLRQQVLANFLLCVNSTPS---GGKLSISGKLTKDRLGKSV-----

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taphya FMKQLVYGDGVRLQQILSDFLSISVKFSPV----GSSVEISAKATKNSIGENL-----
 zmphya1 SMKQKVYGDGIRLQQILSDFLFVSVKFSPA----GGSDVDISSKLTKNSIGENL-----
 atphyb IKSIEVFGDQIRIQQLLAEFLLSIIRYAPS-Q----EWVEIHLSQLSKQMADGF-----
 atphyd VKSMAVYGDQIRLQQVLAEFLLSIVRYAPM-E----GSVELHLCPTLNQMAADF-----
 gmphyb IKTLAVYGDQLRIQQVLSDFLNIVRYAPSPD---GWVEIHVRPRIKQISDGL-----
 lephb1 IKTLTVHGDQVRIQQVLADFLNMVRYAPSPD---GWVEIQLRPSMMPISDGA-----
 lephb2 IKTLRVYGDQVRIQQVFADFLQIMASYAPPRE---GWVEVHLRPSIKQISDGV-----
 npphyB IKTLTVHGDQVRIQQVLADFLNMVRYAPSPD---GWVEIQLQPNMKQISDEV-----
 ntphyb IKTLTVHGDQVRIQQVLADFLNMVRYAPSPD---GWVEIQLQPNMKQISDEV-----
 osphyb IKEASAYGDQYRIQQVLCDFLSMSVRFAPAEN---GWVEIQVRPNIKQNSDGT-----
 pbphyb1 IKTLVVYGDQARIQQVLADFLNMVRYAPSSA---GWVEIHVCPTLKQISDGH-----
 pbphyb2 IKTLAVYGDQARIQQVLADFLNMVRYAPSSA---GWVEIHVCPTLKQISDGH-----
 sbphyB IKDASAYGDQFRIQQVLADFLSMSVRSAPSEN---GWVEIQVRPNVKQNSDGT-----
 slphyb IKTLAVCGDQIRIQQILAEEFLVNMVRYAPSPD---GWVEIHVLPRLKQVADGA-----
 stphyb1 IKTLTVHGDQVRIQQVLADFLNMVRYAPSPD---GWVEIQLRPSMMPISDGV-----
 stphyb2 IKTLTVHGDQVRIQQVLADFLNMVRYAPSPD---GWVEIQLRPSMMPISDGV-----
 zmpphyb1 IKDASAYGDQFRIQQVLADFLSMSVRSAPSEN---GWVEIQVRPNVKQNSDGT-----
 zmpphyb2 IKDASAYGDQFRIQQVLADFLSMSQAQPSEN---GWVEIQVRPNVKQNYDGT-----
 atphyc VSSMRLYGDNLRLQQILSETLLSSIRFTPALR---GLCVSFVKIARIEAIGKRM-----
 osphyc VSCMHLCGDNLRLQQVLADFLACTLQFTQPA---EGPIVLQVIPRMENIGSGM-----
 sbphyc ISRMYLGYGDNLRLQQVLADYLACALQFTQPA---EGPIVLQVIPKKENIGSGM-----
 slphyc LSPVCLFGDNVRLQQILSNFLTIAVRFTPST---GSSVKFAVSSRTEHVGSKM-----
 taphyc VSSMYLYGDNLRLQQVLADYLACALQFTQTA---EGPIVLQVIPKKENIGSGM-----
 zmpphy1 VSCMYLYGDNLRLQQILADYLACALQFTQTA---EGPIVLQVMSKKENIGSGM-----
 zmpphy2 VSHMYIYGDNIRLQQVLADYLACALQFTQPA---EGHIVLQVIPKKENIGSGM-----
 lephye IKTLPYGDQIKLQRVLSDFLSVHHAPSPD---GWVEIKVPLGLKLIDQDN-----
 atphye IKTLPNGDRVKLQLILADLLRNIVNHAPFPN---SWVGISISPQELS RDNG-----
 inphye IKSLPYGDQIKLQLVLSDFLLSIVRHAPSPD---GWVEIRVSPGLKLIDQDN-----
 lephyf VSQLYLIGDNLRLQQVLADFLTTAILFTPFE---DSSVHFHRVIPRKERIGTKM-----
 acphy1 VKLMCDFGDQARLQQVLADFLFCAINHATTNEDEKDWTVKVSRTKTRLDGV-----
 acphy2 IKNTRLFGDQYRLQQVLADFLTTAIRFTSSD---GWVGIVKVVPTIKNMKDGL-----
 acphy3 RPQLILQGGKGRSRSKRRRRVTFCAEPRVSSNSFVGTEEYIAPEIIISGEPHSS-----
 apphy1 LKNTPVFGDQLRLQQVLADFLTTAVRFTSSD---GWVGIVKVVSSIKSIGDGF-----
 cphy2 ISTMRFLFGDQIRLQQVLSDFLINAIRFTPSS---GWVKIKVVPTRKRLLGGNV-----
 mcphy1 FKSMCVFGDQVRLQQVLADFLMNQVQFTPAS---GWVEIKVVPNRSLPGGI-----
 mpphy1 TKNLCIFGDQVRLQQVLADFLNAIRFTPSS---GWVGIVKGVSSRHRQGGGV-----
 msphy1 FKSLSVFGDQVRLQQVLADFLNAVQFTPPS---GWVEIKVPPVKKLPGGV-----
 paphy1 IKTMCYGDQQLRLQQILSNFLINALRFS-TSE---GWVGNKVVPTKRHLGSGV-----
 ppphy0 INTMRLLGQDQIRLQQVLSDFLNNTVRFTPSPE---GWVKIKVVPTRKRLLGGSV-----
 ppphy1 INTMRLLGQDQIRLQQVLSDFLNNTVRFTPSPE---GWVKIKVVPTRKRLLGGSV-----
 ppphy2 IKNMCLYGDQVRLQQVLADFLNAVQFTPSS---GWVGIVKVVPTKKRLLGRGV-----
 ppphy3 IITMRLFGDQVRLQQVLSDFLNAVQFTPSS---GWVKIKVVPTRKRLLGGNE-----
 ppphy4 IKNMCLYGDQVRLQQVLADFLNAVQFTPSS---GWVGIVKVVPTKKRLLGGGI-----
 psphy1 VKTMRLYGDQVRLQQVLADFLNVRFTPSPE---GWVAIKVFTLKQLGGGL-----
 smphy1 IKAMFLYGDQVRLQQVLADFLNAIRFTPSS---NWVGIVKATSRKRLGGVV-----
 aphA DPLPTVMAGSTQLMQLFQNLIANAIKFRS-EE---APQIHIIGAERLED-----
 cph1 GSMPAVMADQIQLMQVFQNLIANIANGIKFAG-DK---SPKIKIWGDRQED-----
 cwCph1 DPLPTVMANSTQLIQLFLNLISNAIKFRS-EA---TPEIHIQAORLED-----
 npCph1 DPLPTVMDSTQLMQLFQNLIGNAIKFHS-DQ---PPQIHVGAEERIED-----
 cwCph1a -----
 npCph1a RPLPTIQCDRVNVNEVFSNLLGNNAFKYND-KA---EQWVEIGYLSQEEGQGVGSRGQGAG
 toCphA DPLPTVMADSTQLMQLFQNLIANAIKFRS-EQ---PPKIHIGAERLED-----
 aphB QLLPVVYCDRIQIGEVFSNLIANSIKYND-KA---NKWIEIGYIDNP-----
 atBphP1 GALPVIFGDPTLRLQWYWNLIENAIIKYSSREP---VSIITISAVETED-----
 atBphP3 GALPVIFGDPTLRLQWYWNLIENAIIKYSSREP---VSIITISAVETED-----
 avAphB QLLPVVYCDRIQIGEVFSNLIANSIKYND-KA---NKWIEIGYIDNQ-----
 chBphP1 SDLPEMSGIPFLAQFLFLNLISNSLKFADATR---VLSIHIVQEGIIVKEEQE-----
 chBphP2 -----
 drBphP PELPVIAADAGLLRDLLLHLLIGNALTFGGPEP---RIAVRTERQGA-----
 goBphP FPIMISADRAINIGLVLTELVINASKYAYDGK---AGPLHVGLAQTSDRLVLT-----
 krBphP -----
 mmBphP2 -----
 paBphP -PQVRAVVDPDRYAQVAANLLSNARHHGLPGR---PVLVTLTRQGD-----
 pfBphP DPDLSIHADPERLFQVLSNLVGNNAIKFTPRLG---TVDVYAKSVGDD-----
 ppBphP1 PNVILDARAYSVMALVLHELATNAAKYGALSRA---GGKLSVSWAIDASNACA-----
 ppBphP2 APLPKVIGDPAFINMALHNLIANAIIKYTRGR---PARIEISAVQHPE-----
 ppkBphP2 APLPKVIGDPAFINMALHNLIANAIIKYTRGR---PARIEISAVQHPE-----
 psBphP1 EPDIKVNADPERLFQVLSNLIGNAIKFTPKLG---RIGVAAMSGDE-----
 psBphP2 AQGLVIDADPERIFQVLSNLVGNNAIKFTPKG---RINIDAVADGDD-----
 pssBphP1 EPDLKVQADPERLFQVLSNLIGNAIKFTPKG---TIGVAAMSNGTE-----
 pssBphP2 AQGLVIDADPERIFQVLSNLVGNNAIKFTPKG---RINIDAVADQNE-----
 pstBphP1 EPDIKVNADPERLFQVLSNLIGNAIKFTPKLG---RIGVAAMSGDE-----

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rcPpr	ESPLPLTADALRLRQILLNIIGNAVKFTPPGGRVDVRALARAGGG-----
r1BphP	EDVLLEPQAFSTAALVFHELMNTNSAKYGSLSGT-GSGTVQLRWHRDDEGNLR-----
atBphP2	PQITLDSRAFSVMAVLHELATNAAKYGALSQN-GGQLHVRWDVNENRDCE-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	DRLPFARCDHNQIRQVLQNLIAINSLKRYRDPAR--PCRIRIFAQPDDNGGRAE-----
rpBphP3N	EPLPTVLCDGSQIRQLLQNLISNAVKYRDAER--LPHVTIAITIDSPPAAP-----
rpBphP4N	QNLLDSWSEKSSIEFDLHGMLTGSSRLPSPVET--TLYRVLQEALTNVVRHAS-----
rpBphP5N	MRLGTAQGHREWIGEVFTNLIGNAIRYND-KP--ERWIEIGVEAGS-----
rpBphP6N	PDVGVNDARAYSVLALVHLHELATNAAKYGALSRS-SGRLKVAWTVGDDGRCD-----
rrBphP	DTAGEIAANSTELSQIVLNLVGNAADAMGGRG--RVFVSLAEA-----
rsBphP1	-----
rsBphP1a	-----
toCphB	RPLPTIMCDRVQVSAIFTNLINGIKYND-KP--EIWVEIGYLE-----
xaBphP	-----
xcBphP	-----
anFPH1	GIPETVIGDQRVRQSISNLISNAVQNTSSGG--VTVEVWHAPGEGDT-----
bFPH2	GIPEMVRGDATRLRQVISNITSNAFQNSVVG--VKIDIKPIQIWPA-----
chFPH1	GLPNHCIGDQRRIRQAISNITANAIQHTTQGC--VKVEAYVAARTGR-----
cnFPH1	DLPRYYVGDSRKIKTVISNLVANSVKFTEKGF--IEVYCGIQRPFDGESSQTSLTESK
gmFPH1	GLPQFVHGDERRIRQALSNTANAVAHTHSGY--VKVEVFVSEVKDR-----
gzFPH1	GLPQFVHGDERRIRQALSNTANAFAHHTKGH--VKVEVFVSEIRDQ-----
ncFPH1	GLPRFVHGDQRRVRQAVANVTANAVKHTSEGS--VRVELYVAEVQDN-----
ncFPH2	GPTQYVRGDPTLSQRSLSILVANAIQHTTSGQ--VVVKWYETAMNPE-----
umFPH1	PDVCLVLGDKNRVRQVITNTVTSVKYTRAGO--IIVSMRKRNEDEREADLPDG-----
aphC	AEIPLVECYAGQMNVFMNVLSNAIDALED-C--KETKSPHNNGEIIISTSFG-----
cph2	LDALTQVGNYRLFDSTLEREWQRLQRIREPLALLCDVDFFKGNDNYGHPAGDR-----
npCph2a1	SELPLVECYAGPLNQVMNVLSNAIDALED-Y--RESPSKPHSSQITICTAIG-----
npCph2a2	ASLPLIECFAGQLNQVMNLLANAIDAVEEPC--RQPAKSDKDHYPRITIKT-----
npCph2b	GNIPKVECYAGQMNVFMNIFSNNAIDALEMT--AEEDKENKPSPPVTIRIST-----
aphyA	-----HLAYLEIRLTHTG-----AGIPELLLNNQMFGE--KDVS
asphyA3	-----HLIDLELRIKHQG-----LGVPaelMAQMFEEDN-KEQS
asphyA4	-----HLIDLELRIKHQG-----LGVPaelMEQMFEEDN-KEQS
atphyA	-----HLANLEIRLTHTG-----AGIPEFLLNQMFGE--EDVS
cphyA	-----HLVHLEFRITYAG-----GGIPESLLNEMFGSE--EDAS
cupphyA	-----QLAHLEFRVTHTSG-----GGVPEELLTQMFGE--VDAL
gmphyA	-----HLVKLELSITHGG-----SGVPEVLLNNQMFGE--GLES
lephyA	-----QLALLEFRIRHTG-----GGVPEELLGQMFGE--ADAS
lspphyA	-----HLVNLELSITHGG-----SGVPEAALNNQMFGE--VLES
mgphyA	-----QLVHVEIRITHMG-----GGVPEGLLNNQMFGE--TDTS
ntphyA	-----QLALLEVRISHTG-----GGVPEELLSQMFGE--AEAS
omphyA	-----QLGRLECRITH-G-----GGVPQEILNNQMFGE--TDAS
osphyA	-----HLIDLELRIKHQG-----KGVPADLLSQMYEDDN-KEQS
pcphyA	-----QLVHLEFRITHTG-----AGVPEEAVSQMFGE--SETS
psphyA	-----HLVNLELSITHGG-----SGVPEAALNNQMFGE--VLES
sbphyA	-----HLIDFELRIKHQG-----AGVPAEILSQMYEEEDN-KEPS
s1phyA1	-----QLANLEFRIMHTG-----GGISEELLSEMFESE--GNAS
s1phyA3	-----QHANLEFRISHTG-----GGISEELLSQMFENQ--GEVS
s1phyA4	-----QLANLEFRIMHTG-----GGISEELLSEMFESE--GNAS
stphyA	-----QLALLEFRIRHTG-----GGVPEELLSQMFGE--ADAS
taphyA	-----HLIDLELRIKHQG-----LGVPaelMAQMFEED-E-PQPS
zmphyA1	-----HLIDFELRIKHQG-----AGVPAEILSQMYGEDN-REQS
atphyb	-----AAIRTEFRMACPG-----EGLPPELVRDMFHSS--RWTS
atphyd	-----SAVRLEFRMACAG-----EGVPPEKVQDMFHSS--RWTS
gmphyb	-----TLLHAEFRMVCAG-----EGLPPELIQDMFNNS--RWGT
lephb1	-----TTVHIELRIICPG-----EGLPPELVQDMFHSS--RWWT
lephb2	-----TIVHIEFRIVCPG-----EGLPPELIQDMFHNS--LWWT
npphyB	-----TVVHIEFRIVCPG-----EGLPPELVQDMFHSN--RWWT
ntphyb	-----TVVHIEFRIVCPG-----EGLPPELVQDMFHSS--RWWT
osphyb	-----DTMLFPFRACPG-----EGLPPEIVQDMFSNS--RWTT
pbphyb1	-----TLVHMEFKYALLNSF-----ACLPPELVQDMFHSS--RWWT
pbphyb2	-----TLVHTEFKYLERVLQTRMLGLQHPLRSFLNFKLTLVMLHRE--GMVP
sbphyb	-----DTELFIFRFTYPG-----EGLPADIVQDMFSNS--QWST
slphyb	-----TVAYIEYRLVSPG-----EGLPPDLVQDMFHNS--RWTT
stphyb1	-----TVVHIELGLYAPG-----R-LPPELVQDMFHSS--RWWT
stphyb2	-----TVVHIELRIICPG-----EGLPPELVQDMFHSS--RWWT
zmphyb1	-----NTELFIFRACPG-----EGLPADVQDMFSNS--QWST
zmphyb2	-----DTELFIFRACPG-----EGLPADIVQDMFSNS--QWST
atphyc	-----KRVELEFRIIHPA-----PGLPEDLVREMFPQL-RKGTS
osphyC	-----QIAHLEFRLVHPA-----PGVPEALIQEMFRHS--PGAS

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sbphyc	-----QIAHLEFRIVHPA-----	-PGVPEALIQEMFRHN--PEVS
slphyc	-----QMFHVEFRITHPL-----	-PGVPENLIREMFQRS--PGMS
taphyc	-----QIAHLEFRLVHPA-----	-PGVPEALIQEMFRHG--PGVS
zmpphy1	-----QIAHLEFRIVHPA-----	-PGVPEALIQEMFQHN--PGVS
zmpphy2	-----QIAHLEFRIVHPA-----	-PGVPEALIQEMFQHN--PGVS
lephye	-----ELIHLQLRMTHPG-----	-QLPALAIDDMSGERN-RWTT
atphye	-----RYIHLQFRMIHPG-----	-KGLPSEMLSDMFETRD-GWVT
inphye	-----VFIHIQFRMTHPG-----	-QGLPSALIEDMVRGGT-RWTT
lephyf	-----YIMHLEFRITHPS-----	-PGIPDDLIQHMFHYS--RSIS
acvphy1	-----HLMHFESRISHSG-----	-QGISEALVEEMTNKS-QKWT
acvphy2	-----HIVHFEFRVSHPG-----	-SGIPEDLVQQMYDRS--QEIT
acvphy3	-----AVDWALGILLYEMLYGR-----	-TPFVGRNRQKTFYNVNLKEI
appy1	-----HVAHFEFRVTHPG-----	-SGIPEDLVQQMYDRS--HEIT
cphy2	-----HVMHLEFRVSHPG-----	-GGLPDELVLEMYDRA--KGMT
mphy1	-----TMAHMEFRVTHSG-----	-EGLPEDLVHQMFDRADAHSKS
mphy1	-----HVVHFEFRVTHPG-----	-AGLPEELVQEMFDRG--RGMT
msphy1	-----SVANVDFRVSHPG-----	-EGLPEDLIDQMFDRADARVKS
paphy1	-----NVMHMEFRITHSG-----	-QGIPEELIKEMFVHN--QDMF
pphy0	-----HVVHLEFRVSHPG-----	-AGLPEELVLEMYDRG--KGMT
pphy1	-----HVVHLEFRVSHPG-----	-AGLPEELVLEMYDRG--KGMT
pphy2	-----HVMHVEFRVTHPG-----	-LGLPEELVHEMFGRG--RGMT
pphy3	-----HVMHLEFRVSHPG-----	-AGLPEELVLEMFDKG--KGMT
pphy4	-----HVMHLEFRVTHSG-----	-MGLPEELVHEMFDRG--RGMT
psphy1	-----HVVHLEFRITHPG-----	-LGLPAELVQDLFDRS--QWAT
smphy1	-----HVMHLEFRITHPG-----	-VGLPEELVQEMFDRG--RGMT
aphA	-----EWLFPSVRDNG-----	-IGIDPQFSDRIFVIFQRLHTR
cph1	-----AWVFAVQDNG-----	-IGIDPQFFERIFVIFQRLHTR
cwCph1	-----EWLFPSVEDNG-----	-IGIDPRFSDRIFIIFQRLHTR
npCph1	-----AWLFPSVRDNG-----	-IGIDPKFSDRIFVIFQRLHTR
cwCph1a	-----	-----
npCph1a	GAGEAIIHQSIPNAPCPIFYIRDNG-----	-IGIPOHHLETIFRLFKRLHSQ
toCphA	-----EWLFPSVQDNG-----	-IGLEPRFSDRIFVIFQRLHTR
aphB	-----PLPPTFYVRDNG-----	-IGIREKHFETIFRIFKRLHSP
atBphP1	-----DVTYSVEDNG-----	-VGFDMAYYNKLFGVFQRLQRV
atBphP3	-----DVTYSVEDNG-----	-VGFDMAYYNKLFGVFQRLQRV
avAphB	-----PLPPTFYVRDNG-----	-IGIREKHFEAIFRIFKRLHSP
chBphP1	-----YYKISYTDNG-----	-IGFNKDYNELIFKIFSRLHSV
chBphP2	-----	-----
drbphp	-----GWSIAVSDQG-----	-AGIAPEYQERIFLLFQRLGSL
goBphP	-----DQGECTPQLKG-----	-TGFGTRMMNAVNSLSGTLT-
krBphP	-----	-----
mmBphP2	-----	-----
paBphP	-----EVCLSVLNET-----	-SGLSEAQLANLFEPFKRESAD
pfBphP	-----IVFTVRDSG-----	-EGIPKDHLPHVFDYWTVKEG
ppBphP1	-----ISWREMGGPTVRPPSR-----	-SGFGTVLIDRSIPFDLGGTS
ppBphP2	-----ETEVCIRNDNG-----	-VGFDMAYANKLFGVFQRLHRM
ppkBphP2	-----ETEVCIRNDNG-----	-VGFDMAYANKLFGVFQRLHRM
psBphP1	-----VVFTVRDSG-----	-EGIPPEQLPHIFERYWTVKEG
psBphP2	-----VLFRVSSDG-----	-IGIPAQHLPYIFQRYWSVKEG
pssBphP1	-----IVFTVRDSG-----	-EGIPPEQLPHIFERYWTVKEG
pssBphP2	-----VLFRVSSDG-----	-IGIPAEHLPFIFQRYWSVKEG
pstBphP1	-----VVFTVRDSG-----	-EGIPPEQLPHIFERYWTVKEG
rcPpr	-----AVFTVRDTG-----	-PGMTPEEVLTAMEPFRQVAQT
rlBphP	-----IGWREKDGPPVVEPKR-----	-HGFGSTIIRRSLIPYDLGGKAE
atBphP2	-----ISWRETLTTLPAPS-----	-AGFGTALISRSLIPYDLGGRST
brBphP	-----	-----
rpBphP1N	-----	-----
rpBphP2N	-----IGSAPAIRICVTDNG-----	-IGFDKKYIDQVFEFPQRHLGP
rpBphP3N	-----AGANVRRARITIADNG-----	-IGFDEQYREQIFEPQRHLGP
rpBphP4N	-----ARHVSVILQLGDDQ-----	-VTMIVEDDGCDFVAGRKPP-
rpBphP5N	-----PPRYYVRDNG-----	-IGIADTDQQLVFQMFHRVDQS
rpBphP6N	-----IEWTESCGPPVRPPT-----	-QGFGTVLLSRSLIPFDLGGWSE
rrBphP	-----PDLGRMVITIRDEG-----	-PGMTLQTQARVFEFFTTKPE
rsBphP1	-----	-----
rsBphP1a	-----	-----
toCphB	-----PITLYVRDNG-----	-IGIRDRHFESIFRIFKRLHGP
xaBphP	-----	-----
xcBphP	-----	-----
anFP1	-----DKATVKIAVLDG-----	-RGISSTLELLFRELEQVSGE
bfFP2	-----STVISLTVQDVG-----	-IGMSESQLDELFQEFEQILDE
chFP1	-----DHVDIEAVSDTG-----	-AGMSQKKLDQLFNDLEQVQSE
cnFP1	-----NTITIEIVISDSG-----	-CGIPTVQLEEMFFTLEGAEPL

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gmFPH1	-----QAVVDFVIEDSG-----	IGMSASQLDTLFRDLEQVSSE
gzFPH1	-----QAVVDFVIEDSG-----	IGMSAGQLDTLFRDLEQVSSE
ncFPH1	-----RARIDIVVQDSG-----	QGMSNAQLDALFRELEQVDTD
ncFPH2	-----NTVIHISITDTG-----	PGFSERELDDMFQEFEQVPDE
umFPH1	-----CDMEVELVVSDTG-----	EGIPQEKELEVIFREFEQVESV
aphC	-----QIRDSIQSIVIRIMDNG-----	PGIPEDLRLRICDPFTTKPV
cph2	-----CLKKIADAMAKVAKRP-----	TDLVARYGGEEFAILSET--
npCph2a1	-----ELEGNIKSVVIRIADNG-----	SGIPEALKARICDPFTTKPV
npCph2a2	-----QLIAN-DWVQIYIKDNG-----	VGMTKAVQAKLFDPFTTKPV
npCph2b	-----KISADNSRLLIRISDNG-----	PGMIPKEIKKRIFDPFYTTKPV
aphyA	E-----	EGLSLMVSRKLVKLMN--GDVQYLQRAGKSSF
asphyA3	E-----	EGLSLLVSRNLLRLMN--GDRVHLREAGVSTF
asphyA4	D-----	EGLGLLVSRKLVKLMN--GDRVHLREAGVSTF
atphyA	E-----	EGLSLMVSRKLVKLMN--GDVQYLQRAGKSSF
cphyA	E-----	EGLSLLISRKLVKLMN--GDVRYMREAGKSSF
cupphyA	E-----	EGLSLLVSRNLVKLMN--GDVQYHREAGRSAF
gmpphyA	E-----	EGISLLIRAKLLKLMN--GDRVYLREAGKSAF
lephyA	E-----	EGISLLVSRKLVKLMN--GEVQYLREAGQSTF
lsphyA	E-----	EGISLHISRKLKLMN--GDVRYLKEAGKSSF
mgphyA	E-----	EGISLLVSRKLVKLMN--GDVQYLREAGKSTF
ntphyA	E-----	EGISLLISRKLVKLMN--GEVQYLREAGRSTF
omphyA	E-----	DGISLFISRKLVVKLMK--GDIQYLREAGRSTF
osphyA	D-----	EGMSLAWSRNLLRLMN--GDRVHMREAGMSTF
pcphyA	E-----	EGISLLISRKLVKLMN--GDVHYLREAGKSTF
psphyA	E-----	EGISLHISRKLKLMN--GDVRYLKEAGKSSF
sbphyA	E-----	EGLSLLVSRNLLRLMN--GNIRHIREAGMSTF
slphyA1	E-----	DGISLLISRKLVKLMN--GDIQYLRSAQTSTF
slphyA3	E-----	EGISLLVSRSRKIVKLMN--GDVQYLRSGSSTF
slphyA4	E-----	DGISLLISRKLVKLMN--GDIQYLRSGTCTF
stphyA	E-----	EGISLLVSRKLVKLMN--GEVQYLREAGRSTF
taphya	E-----	EGLGLLVSRNLLRLMN--GDRVHLREAGVSIF
zmpphyA1	E-----	EGLSLLVSRNLLRLMN--GDIRHLREAGMSTF
atphyB	P-----	EGLGLSVCRKILKLMN--GEVQYIRESERSYF
atphyd	P-----	EGLGLSVCRKILKLMN--GGVQYIREFERSYF
gmpphyB	Q-----	EGLGLSMSRKILKLMN--GEVQYIREAERCYF
lephb1	Q-----	EGLGLSMCRKILKLMN--GEIQYIRESERCYF
lephb2	Q-----	QGLGLSMCRRIQLQLMN--GQVQYIRESERCF
npphyB	K-----	EGLGLSMCRKILKLMN--GEIQYIRESERCYF
ntphyb	K-----	EGLGLSMCRKILKLMN--GDIQYIRESERCYF
osphyb	Q-----	EGLGLSICRKILKLMN--GEVQYIRESERFF
pphyb1	Q-----	EGLGLSMCRKILKLMN--GEVQYIRESERCYF
pphyb2	KI-----	QFQGLSVCQGRILWLSY-PENTTVTLYPLTIW
sbphyB	Q-----	EVGLSTCRKILKLMG--GEVQYIRESERFF
slphyb	Q-----	EGLGLSMCRKILKLMN--GEVQYIRESERSYF
stphyb1	Q-----	EGLGLSMCRKMLKLMN--GEIQYIRESERCYF
stphyb2	Q-----	EGLGLSMCRKMLKLMN--GEIQYIRESERCYF
zmpphyb1	Q-----	EVGLSTCRKILKLMG--GEVQYIRESERFF
zmpphyb2	Q-----	EVGLSTCRKILKLMG--GEVQYIRESERFF
atphyc	R-----	EGLLHITQKLVKLM--RGTLRYLRESEMAF
osphyc	R-----	EGLGLYISQKLVKTMS--GTQYLREAESSF
sbphyc	R-----	EGLGLYICQKLVKTMS--GTQYLREADTSSF
slphyc	R-----	GGLSLYISHKLVKIMN--GTLQYLRGEDYSSF
taphyc	R-----	EGLGHISQKLVKTMS--GTQYLREAESSF
zmpphyC1	R-----	EGLGLYISQKLVKTMS--GTQYLREADTSSF
zmpphyC2	R-----	EGLGLYISQKLVKTMS--GTLQYLREADTSSF
lephyf	Q-----	EGLALNVAQKLLNVMN--GHVRYVRGEDKCYF
atphye	P-----	DGLGLKLSRKLLLEQMN--GRVSYVREDERCF
inphye	Q-----	EGVVLHLSQKLVRMNN--GHVHYVREQQKCYF
lephyf	R-----	EGFGLYISQKLVKIMD--GTQYLREADRSSF
acphy1	-----	EGLAISISCTLIRLMN--GDVKYTTDAGNCF
acphy2	Q-----	EGMGLSWSRKLVKLMN--GDVKYTRAEAGVCYF
acphy3	FPTS-----	IPVSLAGRQLIAGLLQRDPTIRLGLRGASELKHPF
appy1	Q-----	EGMGLSWSRKLVKLMN--GEVSYIRDAGLCYF
cphy2	Q-----	EGLGLNMCRKLVRLMN--GDVQYVRENAQCYF
mphy1	Q-----	EGLGLSMCRKIVRLMS--GEVRYVREPGKSYF
mpphy1	Q-----	EGLGLNMCRKLLKLM--GDVQYIREAGKCYF
msphy1	Q-----	EGLGLSICRKLVRLMN--GEVQYRREGERNFF
paphy1	Q-----	EGLGLYMCQQLVKIMN--GDVQYLREAGRSSF
ppphy0	Q-----	EGLGLNMCRKLVRLMN--GDVHYVREAMQCYF
ppphy1	Q-----	EGLGLNMCRKLVRLMN--GDVHYVREAMQCYF

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pphy2	Q-----EGLGSMCRKLVKLMN--GTVQYIRETGKSCF
pphy3	Q-----EGLGNICRKLVRLMN--GDVQYVREAMQCYF
pphy4	Q-----EGLGSMCRKLVKLMN--GNVQYIRETGKSYF
psphy1	Q-----EVGLGSMCRKLLKLMN--GDVRYIRESGICYF
smphy1	Q-----EGLGSMCRKLVKLMN--GEVEYIREAGKNYF
aphA	DE-----YHGTGMGLAICKKIIECHRGRIWVES-QLGEGATF
cph1	DE-----YKGTGMGLAICKKIIIEGHQGQIWLES-NPGEGSTF
cwCph1	DE-----YPGTGMGLAICKKIMECHRGKIWVES-EIGQGATF
npCph1	DE-----YTGTGMGLAICKKIVECHRGRIWVES-ELGQGATF
cwCph1a	-
npCph1a	EK-----YGGGAGAGLAIVKKIVELHNGQIWKVES-TLGVGSI
toCphA	EE-----YPGTGMGLAICKKIIECHRGRIWVES-QLGEGATF
aphB	SK-----YGGGTGAGLTIAKKIVERHGGKIWKVES-TYGEGSTF
atBphP1	ED-----FEGTGIGLALVRRIVERHHGLVGAEG-TVGEGETF
atBphP3	ED-----FEGTGIGLALVRRIVERHHGLVGAEG-TVGEGETF
avAphB	NK-----YGGGTGAGLTIAKKIVERHGGKIWKVES-TYGEGSTF
chBphP1	AE-----YPGSGIGLALCKKIMKTHKGFIKEAQG-IPEKGAI
chBphP2	-
drBphP	DE-----ALGNGLPLCRKIAELHGGTLTVES-APGEGSTF
goBphP	-YTLTPGLEAVMTLPLDLSILPSEADAS-TEAALSQP
krBphP	-
mmBphP2	-
paBphP	NQR-----NRNGLGIGLYISQAIQAHQ--GRIDVDCRDDVITF
pfbphP	NP-----TGTGLGLYITQGIVEAHGGQIVAES-EPGQGSEF
ppBphP1	VE-----YHPEGLOGFFRIPAKHLSVAEAAETA-LPATPLAR
ppBphP2	ED-----FEGTGIGLASVRRIIERHDGRVWATG-QVDQGASF
ppkBphP2	ED-----FEGTGIGLASVRRIIERHDGRVWATG-QVDQGASF
psBphP1	NP-----TGTGLGLYISQGIKAHGGELAAQS-QVGHGSEF
psBphP2	NP-----RGNGLGLYICQGIITAHHGRLWADS-SLDGSVF
pssBphP1	NP-----TGTGLGLYISQGIKAHGGELAAQS-QVGEGETF
pssBphP2	NP-----RGNGLGLYICQGIITAHHGRLWADS-SLDGSVF
pstBphP1	NP-----TGTGLGLYISQGIKAHGGELAAQS-QVGHGSEF
rcPpr	RA-----AVEGTGLGLPIAKSLVLDLHAGNLAET-APGLGTTV
r1BphP	VR-----YVEDGLEADFSIPARHVVP-TSERSNPLPVGATG
atBphP2	IR-----YLPNGLEAEILLPFRHVSSVSAAFET-KTEAETLP
brBphP	-
rpBphP1N	-
rpBphP2N	DD-----YEGSGIGLAIKRKIVQRHGGRVGVDT-VPGQGSTF
rpBphP3N	DE-----YQGTGIGLAIKRKIVRHGGTISATS-RVGEGETF
rpBphP4N	-
rpBphP5N	-
rpBphP6N	EQ-----KAEGAGVGLAMTRRIVAHGGRIWVQS-RLGEGETF
rrBphP	VD-----YLPGGVVARLGIPGQFVTETLQRLLS-VQASGQST
rsBphP1	GS-----GTGMLGLAVVHGLVEAWGGTIGLES-APGSGTKF
rsBphP1a	-
toCphB	TQ-----YGGGTGAGLTIAKKVVERHGGKIWKVES-TYGEGSTF
xaBphP	-
xcBphP	-
anFPH1	DDSH-YYGGSEEGEREASAPEAKASKDKAVLGLGLALVARIVRNMHGQLTVRS-EEKGSRF
bfFPH2	TD-----HSTIKKPAAQPLIDVKETLGLIGLAVVARYVRNSNGQIRVHS-EVGKGTIF
chFPH1	PA-----SMLEDALIPDQKKLAEQGEKSTLGLGLAIVGRIIRNMNGQLRLRS-EEKGTRF
cnFPH1	QKN-----TGVGLGLAVVARIVARIVEQLEGQLRAES-EVGVGTRF
gmFPH1	EA-----PMSGTKLEEMPREMRTLGLGLAVVARIVRNMDGQLRLKS-EVGQGSRF
gzFPH1	DA-----PTS-SSLDDMPREMRRTLGLGLAVVARIVRNMDGQLRLKS-EVGQGSRF
ncFPH1	IG-----SESSDDDNSQSGKALGLGLAVVARILRNMDGQLRLKS-EVGKGSRF
ncFPH2	DF-----DEATSKPHAVRDNVLRVGVLAFVARFVKQRNGQLKVKS-TKGRGSTF
umFPH1	IAQPGRQDLSEPEGSEASLLRTEPSDSLGLGLAIVARVVKNLGGQLRVDS-QVGEGETSF
aphC	GK-----GTGLGLSISYKIVVDRHGGVFKCDSQLGSGTEF
cph2	-
npCph2a1	GK-----SLEGAINVTEALQVEVANLAIPHTVSGTGHVTL
npCph2a2	GQ-----GTGLGLSISYQIVVDKHHGVFKCDSQPGGLGTEF
npCph2b	GR-----GTGLGLSISYQIIVEKH-GGKLQCLSQPGEGAQF
arphyA	IISAEELAAAN----K-----
asphyA3	IITAEELASAP----TAMGQ-----
asphyA4	ILTAELASAP----TAIGQ-----
atphyA	IITAEELAAAN----K-----
cpphyA	IITVELAAAH----KSRTT-----
cupphyA	IISVELAVAT----KPRA-----
gmpphyA	ILSAELAAAH----NLKA-----
1ephya	IISVELAVAT----NSS-----

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lsphya	IISVELAAGH---KLKG-----
mgphya	IISVELAAAA---NKSTCE-----
ntphya	IISVELAVAT---KSSC-----
omphya	IISVEIAISN---KPNL-----
osphya	ILSVELASAP---AK-----
pcphya	IITVELAAAS---KRES-----
psphya	ILSVELAAAH---KLKG-----
sbphya	ILTAEELAAP---SAVGQ-----
slphya1	IISVELAVAG---NSS-----
slphya3	IISVELAIAG---NSL-----
slphya4	IIYVELAVAD---NSS-----
stphya	IISVELAVAT---KSS-----
taphya	ILTAEELACAP---TAMEH-----
zmphya1	ILTAEELAAAP---SAAGH-----
atphyb	LIILELPVPRKRPLSTASGSGDMMLMMPY-----
atphyd	LIVIELPVP-----LMMMPSPS-S-----
gmpyb	YVLLELPVT---RSSKKC-----
lephb1	MIILDLPMT---RKGPKSFG-----
lephb2	LIILQLPML---IQ-----
npphyB	LIILDLPMT---GRGSKSVG-----
ntphyb	LIILDLPMT---RGGSKSLG-----
osphyb	HIVLELPQP---QQAASRGTS-----
pphyb1	LVILEVPMPNKCERYNCCKCCRLGCLVCN-VY-----
pphyb2	FLLLYRRQS---RSITH-----
sbphyB	LIVIELPQPRP---AADREIS-----
slphyb	FVILELRMPP---KQLMNVE-----
stphyb1	LIILDLPMTR---KGPKSVG-----
stphyb2	LIILDLPMTR---KGPKSVG-----
zmphyb1	LIVLELPQPR---PAAGREIV-----
zmphyb2	LIVLELPQPR---LAAGRENQLIC-----
atphyc	VILTEFPLI-----
osphyc	IVLVEFPVAQ---LSTKRCKASTSKF-----
sbphyc	IILIEFPVAQ---LSSKRSKPSTSFK-----
slphyc	IVFLEFPVA-----
taphyc	IVLVEFPVAQ---LNSKRSRPSTSFSNF-----
zmphyc1	IILMEFPVAQ---LSSKRSKPSTSFK-----
zmphyc2	IILIEFPVAQ---LSSKRSKPSPSKF-----
lephye	LIDVELQTLK-PTQHGPKLEVTOEIEI-----
atphye	QVDLQVKTMLGVESRGTEGSSSIK-----
inphye	LIDLDFTKQK-PRSRESSMDTKAD-----
lephyf	IILVEFPLME---KKNN-----
acvphy1	LVTIQFPLAH---RDDATSVR-----
acvphy2	LVTVELPLVQ---EDD-----
acvphy3	FREINWPLIRWRKFSSANQAHANNVSSL-EGESDSGNWEANGSTQSFQDTF-----
appy1	WSMLELPVVQ---SGKQAMF-----
cphy2	VVYVELPMAQ---RDDAASQM-----
mphy1	LVLLDLPLAQ---REDAGSAM-----
mpphy1	LVNVELPIAQ---RDDAGSVK-----
msphy1	LLQLELPLAQ---RDDQASM-----
paphy1	IINVEFPLAQ---TDKQ-----
ppphy0	VVNVELPMAQ---RDDASSQCRSLYSYLL-A-----
ppphy1	VVNVELPMAQ---RDDASSQM-----
ppphy2	LVEVELPLAQ---RDDAGSVRSTVV-----
ppphy3	VLYVELPLAQ---QDDAASQM-----
ppphy4	LVEVELPLAQ---RDDAGSVR-----
psphy1	LVNVEFPMQAQ---REDAASIK-----
smphy1	LVSLELPLAQ---RDDAGSVKFQASS-----
aphA	YFTIPVGGRERERRNGRKTQNNLFS-----
cph1	YFSIPIGN-----
cwCph1	YFTIPVGTERDRKRGSTR-----
npCph1	YFTIPVGGREERRNGRKTQNHFLGRGQ-----
cwCph1a	-----
npCph1a	YFTLE-----
toCphA	YFTIPVGGRERERRNGRQTQKDLFGRG-----
aphB	YFTLQDV-----
atBphP1	SFTLPVTKVEEEKIA-----
atBphP3	SFTLPVTKVEEEKIA-----
avAphB	YFTLQGV-----
chBphP1	YLYFPVSKNS-----
chBphP2	-----
drBphP	RCWLDPAGPLPGAADA-----
goBphP	PYPYP-----

Rockwell, Su, and Lagarias Supplemental Figure 1

krBphP	-----
mmBphP2	-----
paBphP	CLRLPVRQAETGSSS-----
pfBphP	RFTVPRLD-----
ppBphP1	ANGAFAARS-GLCVLILEDQLVIAVGLEQ-ILNDAQIKDVITASSEDQAMQLLGSHPDA
ppBphP2	HFTLPRNTAT-----
ppkBphP2	HFTLPRNTAT-----
psBphP1	RFTVPIAH-----
psBphP2	SFTLPMHQGQDT-----IGESTFLKQSGTTHRLAQSISSKLERQQL
pssBphP1	RFTVPMAV-----
pssBphP2	SFTLPVHQGTDS-----IGETTFLKQSGTTHRLAQSISSKLERQQL
pstBphP1	RFTVPIAH-----
rcPpr	TIEIGA-----
rlBphP	RKTIPDDQPLSLGNVLLVENNLIIAMGEDILRLGADVATAPSUTE-AMEILAGQSFDL
atBphP2	QPRRYNREE-PLKVLLVEDQMLIAMDVEN-MLEDNGIKAIETATSSAMAIEKLKTYLPDV
brBphP	-----
rpBphP1N	-----
rpBphP2N	WFTLPVSDDHGQG-----
rpBphP3N	TFTLPLCDQDAAES-----
rpBphP4N	YARIPL-----
rpBphP5N	YFTLAPDEERHDA-----
rpBphP6N	DSSALNIADAS---ILLVEDQLVIALDAEDMLGAIGAKLVTVASAEEALQTIAQQPPTL
rrBphP	VISFPINNP-----
rsBphP1	-----
rsBphP1a	-----
toCphB	YFTLQEVK-----
xaBphP	-----
xCBphP	-----
anFPH1	QISLQFPIPEGSDTKS-----PTA-EHRPVATGDSAAP-----FSTGDDVILV
bfFPH2	GIELPFEH-----APAASNTQEIPPIISTGRQIRPF
chFPH1	VIQLPFEIPDSEADSV-----TTG-GASPAGSVTPHAEESLPNVVSSTAGERTLI
cnFPH1	YFNVPVMVAHP-----SGRPGSR-QSSHNSRNTNSSLRTRTGGSGSKS--DSV
gmFPH1	VVQLPFLLSNECPSSHGNEN-LPTSVPTN-KSTNSAESANTATSAPLSLTAAPEGEITLV
gzFPH1	VVQLPFLLSDQYSGSH-----LKSAPAG-RGNQSFNSTSTASTAPDALRAAPEGEITLV
ncFPH1	VIQLPFDLPEEETSRDTVG-----ASSG-NTAQLSLGSGTASASAASVTQMQDGEVMLV
ncFPH2	TLEIPFAVS-----SHCSSIASRRRDASPLPVLTMPG-----
umFPH1	TYYIPFCSAETTPTEMPPIGSSGGSGTK-RSSDTISMRRSTSMGSGSASSAGRSEIDSL
aphC	WIEIPIQVNGNW-----
cph2	SIGIAYVTPERHINPNALVKAADLALYEAKAKGRNQWLAYEGSQLPHVDGEV-----
npCph2a1	WIEIPVSQITKF-----
npCph2a2	VIEIPIKQSERELANVLIDKKESDTDNS-----
npCph2b	WIEIPVKPPAKIVYSR-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphya	-----
lephya	-----
lsphya	-----
mgphya	-----
ntphya	-----
omphya	-----
osphya	-----
pcphya	-----
psphya	-----
sbphya	-----
slphya1	-----
slphya3	-----
slphya4	-----
stphya	-----
taphya	-----
zmphya1	-----
atphyb	-----
atphyd	-----
gmphyb	-----
lephb1	-----
lephb2	-----
npphyB	-----

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ntphyb	-
osphyb	-
pphyb1	-
pphyb2	-
sbphyB	-
s1phyb	-
s2phyb1	-
s2phyb2	-
zmpyb1	-
zmpyb2	-
atphyC	-
ospphyC	-
sbphyC	-
s1phyC	-
taphyc	-
zmpphyC1	-
zmpphyC2	-
1ephyc	-
atphyE	-
inphyE	-
1ephycf	-
acvphy1	-
acvphy2	-
acvphy3	-
apphy1	-
cphy2	-
mphy1	-
mphy1	-
msphy1	-
paphy1	-
ppphy0	-
ppphy1	-
ppphy2	-
ppphy3	-
ppphy4	-
psphy1	-
smpphy1	-
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drBphP	-
goBphP	-
krBphP	-
mmBphP2	-
paBphP	-
pfBphP	-
ppBphP1	AILDVNLTGTSISVADELVRRQVPFLFATGYGDGISIPEHLQHVPVARKPYDANAILAS
ppBphP2	-
pkBphP2	-
psBphP1	-
psBphP2	ED-----RLTRAG
pssBphP1	-
pssBphP2	ED-----RLTRAG
pstBphP1	-
rcPpr	-
rlBphP	ALLDVNLGDETSFGIADRLAADGVPFVFATGYGEGIAQANSHSDAPVLQKPYTMEGVTDI
atBphP2	AIIDINLGSNTSIPVARELHRRGIPFLFATGYADGSMVPDEFGAVPVIRKPYDEDALMAG
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-

Rockwell, Su, and Lagarias Supplemental Figure 1

rpBphP5N	
rpBphP6N	AILDVNLngNGSSLPVADELERLGIPFIFATGYGDTAMIPERMRLPIVRKPYSIDSLRGA
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	D---STTGSKRNSQ-DSL-----
bfFPH2	S---DSGSNYDES-----DKMNSTY
chFPH1	APSLSRQGSAGEDDKQTSNVVVRKTSAGSLASKNSLRSFKTSSSQRSVDVRLIDAIQEPH
cnFPH1	VS-----LRSDGS--GVPEIESFVQDFG----GSHLPAPVGDDDPRLLEAQERMSRLG
gmFPH1	D---RVSSMTSAVEGGDASMKGSRASQRSMSSH-----GSHQSDADRLIDAISTPL
gzFPH1	D---RASTMASAG---DISLKGS GASQRSMGSHTSRSGSHQSDADRLINAIQTPL
ncFPH1	D---RNNGSSWSVNNATGSLASKKS YDDNL SITS---KGSGRSALSDADRLIDAIQNPL
ncFPH2	-----PL
umFPH1	VEAIQQPVLRDQATSEDVVARRTAEGVSPGLIHGSKIVSAGSIHRPEYAAQRTRSFDSG
aphc	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cphyA	-----
cupphyA	-----
gmpphyA	-----
lephyA	-----
lphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyd	-----
gmpphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntphyB	-----
osphyB	-----
pphyb1	-----
pphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
osphyC	-----
sbphyC	-----
slphyC	-----
taphyC	-----
zmpphyC1	-----
zmpphyC2	-----
lephyE	-----
atphyE	-----
inphyE	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

lephyf	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
appy1	-----
cpphy2	-----
mphy1	-----
mpphy1	-----
msphy1	-----
paphy1	-----
ppphy0	-----
ppphy1	-----
ppphy2	-----
ppphy3	-----
ppphy4	-----
psphy1	-----
smpphy1	-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	LQSLLELG-----
ppBphP2	-----
pkBphP2	-----
psBphP1	-----
psBphP2	LLNELNHRVKNTLATVQAIASLTVNNSSTSLSFRKSFDAR-----
pssBphP1	-----
pssBphP2	LLNELNHRVKNTLATVQAIASLTVNSSASLESFKSFGAR-----
pstBphP1	-----
rcPpr	-----
rlBphP	LARVPLPRRE-----
atBphP2	IGVLVGDTERV-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	LSAMLDDRE-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	--TRPDVPRKSEPED-TAPADGAGEQASGESEAQTRPKKTGESTASTSHEQSETAR-----
bfFPH2	TMSNFGSTPLATPIE---EGSSATTSSFDLAMHSKEEYVEPPSVRRRSSLP-----
chFPH1	LIGRGDTSPGSRSMRPTLTKRSSL DANASA AARRRSKSLEDFSNQTVVPPHQIMQS-----
cnFPH1	TFPVTDSSYPVRATKVNTDDQHVVKSPK-----PKKPRFTAIGS-----
gmFPH1	SLNDREGSEYPLPAS-VRSGGSSMRPTSRGAVLSGRSVSP----PQSPVATKPHS-----
gzFPH1	SLNEREGTEFPIQGG-RGSRSNSMRAESRGAISLDGRSASPSDQQPQSPVSTKPRS-----
ncFPH1	TLGEPEP-ESVARQR-RNSRGPYNPSSSLGSSKGRSVSPGSRKRPDVPTRSVSSPNTK
ncFPH2	TFGAGSSVPDRSTF--GTSRDKPSPIIRPGSSTADTSPRDFQTPSPHH-----
umFPH1	SHPVEGSGIPVRSVKINPQALDANDRADRRP ASSAFLSATTHARPVKPSHTSAAESFK
aphC	-----
cph2	-----
npCph2a1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cphyA	-----
cupphyA	-----
gphyA	-----
lephyA	-----
lphyA	-----
mgphyA	-----
ntphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyD	-----
gphyB	-----
lephb1	-----
lephb2	-----
nphyB	-----
ntphyB	-----
osphyB	-----
pbphyb1	-----
pbphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
osphyC	-----
sbphyC	-----
slphyC	-----
taphyC	-----
zmpphyC1	-----
zmpphyC2	-----
lephyE	-----
atphyE	-----
inphyE	-----
lephyF	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
appy1	-----
cphy2	-----
mphy1	-----
mphy1	-----
msphy1	-----
paphy1	-----
pphy0	-----
pphy1	-----
pphy2	-----
pphy3	-----
pphy4	-----
psphy1	-----
smphy1	-----
aphA	-----
cph1	-----
cwCph1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drBphP	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	----- SRPSGPSSGAPSAPERRP -----
bfFPH2	----- FLNMIDLMSKK -----
chFPH1	----- TVPGKEAIPGSADPVVALKVPDEGGSSPIGVRPSGN -----
cnFPH1	----- SERSTSRRHNTTSSKT-SSASQSPAFS -----
gmFPH1	----- EPGSTGVVDSKTPIRAVKIPDEYSDVQPQRQPSEHSR -----
gzFPH1	----- EPGSTEVMDSKTPIRAVKMPDDYTDMPQKPQPSEQSG -----
ncFPH1	----- KDLPEEKPTTEVAGPSEPAAAQGVQYVTDSRVPIKPVKLDEMFDKPVVPPQSTSKV -----
ncFPH2	----- AEVEQRFRDKVPQLAQATLPVDAKLRSCQMADKEATVSPTTRAKSGVEAPQNEAVSPDC -----
umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmphyA	-----
lephyA	-----
lsphyA	-----
mgphyA	-----
ntpphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

slphya1
slphya3
slphya4
stphya
taphya
zmphya1
atphyb
atphyd
gmpphyb
lephb1
lephb2
npphyB
ntpphyb
osphyb
pbphyb1
pbphyb2
sbphyB
slphyb
stphyb1
stphyb2
zmpphyb1
zmpphyb2
atphyc
osphyc
sbphyc
slphyc
taphyc
zmpphyC1
zmpphyC2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mphy1
msphy1
paphy1
ppphy0
ppphy1
ppphy2
ppphy3
ppphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB
chBphP1
chBphP2
drBphP
goBphP
krBphP
mmBphP2
paBphP
pfBphP
ppBphP1
ppBphP2
ppkBphP2
psBphP1

Rockwell, Su, and Lagarias Supplemental Figure 1

psBphP2	-LFALSQA-----RAEW
pssBphP1	-
pssBphP2	-LFALSQAHDALARAEW
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
tcCphB	-
xaBphP	-
xcBphP	-
anFPH1	-LRVLVAEDDPINAKI
bfFPH2	-LSILIAEDNPINSKL
chFPH1	-ILGEVAEDKPIQPAAEPEPLS-
cnFPH1	-ADNMHVLVAEDDPVNSRI
gmFPH1	-RPPSSNSVQGPKR-NKKGPNKG-TVMRIMVVEDDPINSQI
gzFPH1	-GGTQMTESQHLEVLAEDDPINMKI
ncFPH1	-VLFEMKGNDRPVTKAATESITS-
ncFPH2	-AGTQMTDQQHLQVLVAEDDPINMKI
umFPH1	-FEIKDAVADAKAASSAVKEQQSVSSQQPAPPAPAKEASTNNKLQVLVAEDDPINVKV
aphC	-YTVIVADDNMINVQI
cph2	-GDVHMAKRSSDERRSSSSSVAKRRLAVMRGLHKAPGGRGEKIAPLRLVVEDDPINRMI
npCph2a1	-
npCph2a2	-
npCph2b	-
arphyA	-
asphyA3	-
asphyA4	-
atphyA	-
cpphyA	-
cupphyA	-
gmpphyA	-
lephyA	-
lspphyA	-
mgphyA	-
ntpphyA	-
omphyA	-
osphyA	-
pcphyA	-
psphyA	-
sbphyA	-
slphyA1	-
slphyA3	-
slphyA4	-
stphyA	-
taphyA	-
zmpphyA1	-
atphyB	-
atphyd	-
gmpphyB	-
lephb1	-
lephb2	-
npphyB	-
ntpphyB	-
osphyB	-
pbphyb1	-
pbphyb2	-
sbphyB	-
slphyB	-
stphyb1	-
stphyb2	-

Rockwell, Su, and Lagarias Supplemental Figure 1

zmphyb1	-
zmphyb2	-
atphyc	-
osphyc	-
sbphyc	-
slphyc	-
taphyc	-
zmphyc1	-
zmphyc2	-
lephye	-
atphye	-
inphye	-
lephyf	-
acvphy1	-
acvphy2	-
acvphy3	-
appy1	-
cphy2	-
mcphy1	-
mpphy1	-
msphy1	-
paphy1	-
ppphy0	-
ppphy1	-
ppphy2	-
ppphy3	-
ppphy4	-
psphy1	-
smphy1	-
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drbphp	-
goBphP	-
KrBphP	-
mmBphP2	-
paBphP	-
pfBphP	-
ppBphP1	-
ppBphP2	-
ppkBphP2	-
psBphP1	-
psBphP2	MSTELADLLAQLQDVNGGQHRITFTGDPVR-----LEPRISLTLSMVL
pssBphP1	-
pssBphP2	ISTELVDLIEQLQEQQDSGAHRISFEGDPVT-----LEPRFSLTLSMVL
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
toCphB	-
xaBphP	-
xcBphP	-

Rockwell, Su, and Lagarias Supplemental Figure 1

anFPH1	IEKRLEKLGHHTVQRTVNGEECANAY-----	SAESTQWDVVLMQPILDGIES
bFPH2	LHKRLSKLSHKPEITAEGQSCYDYYT-----	SGNNKVDVILMDLQMPPLVDGDKA
chFPH1	VKKRLEKLGHHVHLTVNGEECASAYC-----	DNSKDIDVVLMMDQMPIOVDGGLTS
cnFPH1	LQKRLKMDKHVVAVTNGQEAVDQLEKD-----	RDI DAI LMDI QMPIO MDGRTS
gmFPH1	LRKRLERVGHGHHHTANGEDCAAAYR-----	ERSKEFDVVLMMDQMPIOVDGGLTS
gzFPH1	LRKRLERVGHGHHHTVNGEDCAAAR-----	ERSSEFDVVLMMDQMPIOVDGGLTS
ncFPH1	LRKRLEKAGYKVTHALNGEDCAAAYE-----	DKPVVFDDVVLMMDQMPIOVDGGLTS
ncFPH2	LERRLTKLGHRLVSRDGQECFNLF-----	SNRSTVDFVLMDLNMPVVDGFAS
umFPH1	LKKRLGLDGHTLLAVNGEEGVRQFEQDA-----	KEIDVILMDLQMPICNGQEA
aphC	-----	-----
cph2	-----	-----
npCph2a1	-----	-----
npCph2a2	-----	-----
npCph2b	-----	-----
arphyA	-----	-----
asphyA3	-----	-----
asphyA4	-----	-----
atphyA	-----	-----
cpphyA	-----	-----
cupphyA	-----	-----
gmpphyA	-----	-----
lephyA	-----	-----
lspphyA	-----	-----
mgphyA	-----	-----
ntpphyA	-----	-----
omphyA	-----	-----
osphyA	-----	-----
pcphyA	-----	-----
pphyA	-----	-----
sbphyA	-----	-----
slphyA1	-----	-----
slphyA3	-----	-----
slphyA4	-----	-----
stphyA	-----	-----
taphyA	-----	-----
zmpphyA1	-----	-----
atphyB	-----	-----
atphyd	-----	-----
gmpphyB	-----	-----
lephb1	-----	-----
lephb2	-----	-----
npphyB	-----	-----
ntpphyB	-----	-----
osphyB	-----	-----
pbphyb1	-----	-----
pbphyb2	-----	-----
sbphyB	-----	-----
slphyB	-----	-----
stphyb1	-----	-----
stphyb2	-----	-----
zmpphyb1	-----	-----
zmpphyb2	-----	-----
atphyC	-----	-----
osphyC	-----	-----
sbphyC	-----	-----
slphyC	-----	-----
taphyC	-----	-----
zmpphyC1	-----	-----
zmpphyC2	-----	-----
lephyE	-----	-----
atphyE	-----	-----
inphyE	-----	-----
lephyf	-----	-----
acvphy1	-----	-----
acvphy2	-----	-----
acvphy3	-----	-----
appy1	-----	-----
cpphy2	-----	-----
mphy1	-----	-----
mpphy1	-----	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

msphy1	-
paphy1	-
pphy0	-
pphy1	-
pphy2	-
pphy3	-
pphy4	-
psphy1	-
smpphy1	-
aphA	-
cph1	-
cwCph1	-
npCph1	-
cwCph1a	-
npCph1a	-
toCphA	-
aphB	-
atBphP1	-
atBphP3	-
avAphB	-
chBphP1	-
chBphP2	-
drbphp	-
goBphP	-
krBphP	-
mmBphP2	-
paBphP	-
pfBphP	-
ppBphP1	-
ppBphP2	-
ppkBphP2	-
psBphP1	-
psBphP2	HKLMANALQHGALSSPAGQVTVASTLNSHHNPPTLSIDWLETEGPPVVASNVKGFLRLI
pssBphP1	-
pssBphP2	HELMANALQHGALSSASGQVTVTSTLTAEHTPPTLKIEWKETGGPPVATTVKGFGLRLI
pstBphP1	-
rcPpr	-
rlBphP	-
atBphP2	-
brBphP	-
rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
toCphB	-
xaBphP	-
xCBphP	-
anFPH1	TKRIRQHE-----SQSEVANL--HIPIFAVSASLLEKDQVQMYMDIGFDGWIMKPI
bfFPH2	TRMIRKFERDNLE-----LHQIRRVRPIIAASASLLEEHRFDYIEAGFDGWIMKPI
chFPH1	TKMIRSFEKHSN-----MYSPRAAL-----
cnFPH1	AKEIRELEARTP----QPDDIEPFKVDGRTPIFAVSASLYEDDRANLAEN-FDGWLLKPL
gmFPH1	TKMIRSMEASGEH---QGHSSLANSNYRIPIFAVSASLVEREKQTVDAGFDGWILKPI
gzFPH1	TKMIRSMEASADY---HGH SALANTNHRIPVFAVSASLVEREKQKYIDAGFDGWILKPI
ncFPH1	TKMIRAFEKTNRDGS-GQQLSDIASDHGRVPIFAVSASLVEQEKDTYVDAGFDGWILKPI
ncFPH2	IRMIRDQEYSHPT----PSRVVQCCGRTPIFAVSGMLRRGQQCCKEAGFDGWMPKPV
umFPH1	CIRIRDLEHKWAERGEQADRPASQILNGRVPILAVSATLVPQMRQEMVDIGMDGWLKPI
aphC	-
cph2	-
npCph2a1	-
npCph2a2	-
npCph2b	-
arphyA	-
asphyA3	-
asphyA4	-
atphyA	-

Rockwell, Su, and Lagarias Supplemental Figure 1

cpphya
cupphya
gmphya
lephya
lsphya
mgphya
nphy
omphya
osphya
pcphya
psphya
sbphya
slphya1
slphya3
slphya4
stphya
taphya
zmphya1
atphyb
atphyd
gmphyb
lephb1
lephb2
npphyB
nphyb
osphyb
pbphyb1
pbphyb2
sbphyb
slphyb
stphyb1
stphyb2
zmphyb1
zmphyb2
atphyc
osphyc
sbphyc
slphyc
taphyc
zmphyc1
zmphyc2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
apphy1
cpphy2
mcphy1
mpphy1
msphy1
paphy1
ppphy0
ppphy1
ppphy2
ppphy3
ppphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB

Rockwell, Su, and Lagarias Supplemental Figure 1

chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	RRSIERELKGKVDIKFASTGVWSMLIPWPEKPESSL-----
pssBphP1	-----
pssBphP2	RRSIERELKGQADIQFARTGIIWSMLIPWPDKPESRL-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xCBphP	-----
anFPH1	NFVRLNTLLAGIHEERARNGAVYQPG-QWEKGGWFTPYTHS-----
bfFPH2	NFSRLEFLQGLNNPQLKQRSLYTPG-MWELEGGWFFA-----
chFPH1	-----
cnFPH1	DFSRVRAILEGLESSEKRGAEVYQQG-NWERGGYLKAAPLP-----ASSA
gmFPH1	DFKRLNTLLAGISDEEVRKSCLYEPG-QWERGGWFLSRAVLGGSVTSDETPKAVPDAKD
gzFPH1	DFKRLNTLLAGISDEEVRNNSCLYESG-QWERGGWFHPRSLVGGSEASDETPRAEHDAKD
ncFPH1	DFKRLETLLQGITDDKARNDALYVQG-QWERGGWFEEKGVGNMGQEQQEENHEQ-----
ncFPH2	DMKRLVRCLAGGLDPNARRMCVYDEK-RFELGGWFDAE-----
umFPH1	DFARLGALLKGLLHPEDRVANHWRSGYYWEKGGWLSEPAQRSLVAPS AVSEMIGHSSN
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

arphyA	-----
asphyA3	-----
asphyA4	-----
atphya	-----
cpphya	-----
cupphya	-----
gmphya	-----
lephya	-----
lsphya	-----
mgphya	-----
ntphya	-----
omphya	-----
osphya	-----
pcphya	-----
psphya	-----
sbphya	-----
slphya1	-----
slphya3	-----
slphya4	-----
stphya	-----
taphya	-----
zmphya1	-----
atphyb	-----
atphyd	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

gmphyb
lephb1
lephb2
npphyB
ntpheyb
osphyb
pbphyb1
pbphyb2
sbphyB
slphyb
stphyb1
stphyb2
zmpphyb1
zmpphyb2
atphyc
osphyc
sbphyc
slphyc
taphyc
zmpphyC1
zmpphyC2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mphy1
msphy1
paphy1
ppphy0
ppphy1
ppphy2
ppphy3
ppphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB
chBphP1
chBphP2
drBphP
goBphP
krBphP
mmBphP2
paBphP
pfBphP
ppBphP1
ppBphP2
ppkBphP2
psBphP1
psBphP2
pssBphP1
pssBphP2
pstBphP1
rcPpr
rlBphP
atBphP2
brBphP

Rockwell, Su, and Lagarias Supplemental Figure 1

rpBphP1N	-
rpBphP2N	-
rpBphP3N	-
rpBphP4N	-
rpBphP5N	-
rpBphP6N	-
rrBphP	-
rsBphP1	-
rsBphP1a	-
toCphB	-
xaBphP	-
xCphP	-
anFPH1	-
bfFPH2	-
chFPH1	-
cnFPH1	STPSTTQSSPCTSTS-
gmFPH1	KDIGN-TVAAEEAKAESDASEPAPST-
gzFPH1	KDIGETAIISEDAKETGGAGEAKPDND-
ncFPH1	-
ncFPH2	-
umFPH1	ASNANPLSPPPLSSPSA-
aphC	-
cph2	-
npCph2a1	-
npCph2a2	-
npCph2b	-
arphyA	-
asphyA3	-
asphyA4	-
atphyA	-
cpphyA	-
cupphyA	-
gmphyA	-
lephyA	-
lsphyA	-
mgphyA	-
ntpHYA	-
omphyA	-
osphyA	-
pcphyA	-
psphyA	-
sbphyA	-
slphyA1	-
slphyA3	-
slphyA4	-
stphyA	-
taphyA	-
zmphyA1	-
atphyB	-
atphyd	-
gmphyB	-
lephb1	-
lephb2	-
npphyB	-
ntpHYB	-
osphyB	-
pbphyb1	-
pbphyb2	-
sbphyB	-
slphyB	-
stphyb1	-
stphyb2	-
zmphyb1	-
zmphyb2	-
atphyc	-
osphyc	-
sbphyc	-
slphyc	-
taphyc	-
zmphyc1	-

Rockwell, Su, and Lagarias Supplemental Figure 1

zmpphy2
lephye
atphye
inphye
lephyf
acvphy1
acvphy2
acvphy3
appy1
cpphy2
mcphy1
mphy1
msphy1
paphy1
pphy0
pphy1
pphy2
pphy3
pphy4
psphy1
smphy1
aphA
cph1
cwCph1
npCph1
cwCph1a
npCph1a
toCphA
aphB
atBphP1
atBphP3
avAphB
chBphP1
chBphP2
drbphp
goBphP
krBphP
mmBphP2
paBphP
pfBphP
ppBphP1
ppBphP2
ppkBphP2
psBphP1
psBphP2
pssBphP1
pssBphP2
pstBphP1
rcPpr
rlBphP
atBphP2
brBphP
rpBphP1N
rpBphP2N
rpBphP3N
rpBphP4N
rpBphP5N
rpBphP6N
rrBphP
rsBphP1
rsBphP1a
toCphB
xaBphP
xcBphP
anFPH1
bfFPH2
chFPH1
cnFPH1
gmFPH1
gzFPH1
ncFPH1
ncFPH2

Rockwell, Su, and Lagarias Supplemental Figure 1

umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----
arphyA	-----
asphyA3	-----
asphyA4	-----
atphyA	-----
cpphyA	-----
cupphyA	-----
gmpphyA	-----
lephyA	-----
lspphyA	-----
mgphyA	-----
ntpphyA	-----
omphyA	-----
osphyA	-----
pcphyA	-----
psphyA	-----
sbphyA	-----
slphyA1	-----
slphyA3	-----
slphyA4	-----
stphyA	-----
taphyA	-----
zmpphyA1	-----
atphyB	-----
atphyd	-----
gmpphyB	-----
lephb1	-----
lephb2	-----
npphyB	-----
ntpphyB	-----
osphyB	-----
pbphyb1	-----
pbphyb2	-----
sbphyB	-----
slphyB	-----
stphyb1	-----
stphyb2	-----
zmpphyb1	-----
zmpphyb2	-----
atphyC	-----
osphyC	-----
sbphyC	-----
slphyC	-----
taphyC	-----
zmpphyC1	-----
zmpphyC2	-----
lephyE	-----
atphyE	-----
inphyE	-----
lephyf	-----
acvphy1	-----
acvphy2	-----
acvphy3	-----
appy1	-----
cpphy2	-----
mcphy1	-----
mpphy1	-----
msphy1	-----
paphy1	-----
ppphy0	-----
ppphy1	-----
ppphy2	-----
ppphy3	-----
ppphy4	-----
psphy1	-----

Rockwell, Su, and Lagarias Supplemental Figure 1

smpphy1	-----
aphA	-----
cph1	-----
cwCph1	-----
npCph1	-----
cwCph1a	-----
npCph1a	-----
toCphA	-----
aphB	-----
atBphP1	-----
atBphP3	-----
avAphB	-----
chBphP1	-----
chBphP2	-----
drbphp	-----
goBphP	-----
krBphP	-----
mmBphP2	-----
paBphP	-----
pfBphP	-----
ppBphP1	-----
ppBphP2	-----
ppkBphP2	-----
psBphP1	-----
psBphP2	-----
pssBphP1	-----
pssBphP2	-----
pstBphP1	-----
rcPpr	-----
rlBphP	-----
atBphP2	-----
brBphP	-----
rpBphP1N	-----
rpBphP2N	-----
rpBphP3N	-----
rpBphP4N	-----
rpBphP5N	-----
rpBphP6N	-----
rrBphP	-----
rsBphP1	-----
rsBphP1a	-----
toCphB	-----
xaBphP	-----
xcBphP	-----
anFPH1	-----
bfFPH2	-----
chFPH1	-----
cnFPH1	-----
gmFPH1	-----
gzFPH1	-----
ncFPH1	-----
ncFPH2	-----
umFPH1	-----
aphC	-----
cph2	-----
npCph2a1	-----
npCph2a2	-----
npCph2b	-----

Supplemental Figure 1. A sequence alignment of 122 phytochromes and phytochrome-related proteins is shown. All sequences only contain canonical amino acids and contain both the conserved Asp-Ile/Val-Pro motif corresponding to Asp207-Pro209 in the sequence of the BphP from *D. radiodurans* (drbphp) and the conserved Tyr equivalent to Tyr176 in this sequence. This alignment was used to prepare Figures 3 and 4 in the text.